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Distribution and Abundance of East Coast Bivalve Mollusks Based on Specimens in the National Marine Fisheries Service Woods Hole Collection

Roger B. Theroux and Roland L. Wigley

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Distribution and Abundance of East Coast Bivalve Mollusks Based on Specimens in the National Marine Fisheries Service Woods Hole Collection

ROGER B. THEROUX[1] and ROLAND L. WIGLEY[2]

ABSTRACT

The distribution and numerical abundance of over 108,000 specimens of bivalve mollusks (81% of which were alive when captured) collected and maintained by the Benthic Dynamics Investigation at the NMFS Northeast Fisheries Center at Woods Hole, Mass., are presented. They are illustrated in a series of charts, and their bathymetric range and bottom sediment preferences are outlined in tabular form. Taxonomic groups represented include 5 subclasses, 8 orders, 46 families, 99 genera, and 164 species. The specimens are contained in 10,465 lots from 2,767 sampling sites along the east coast continental shelf and slope, and upper continental rise between Nova Scotia and southern Florida. Samples range in depth from 0 to nearly 4,000 m. The collections were obtained by a variety of research vessels and persons using quantitative and qualitative sampling devices (i.e., grabs, dredges, trawls, etc.) over a period of 21 yr. Also included are current vernacular names, zoogeographic data, and a reference to the original description of represented species.

The data upon which this report is based are stored on magnetic tape and disc files, and the specimens are stored in a Specimen Reference Collection at the Northeast Fisheries Center in Woods Hole, Mass.

INTRODUCTION

Bivalves, as a group, are a major component of the U.S. east coast macrobenthic invertebrate fauna accounting for 22% of the total number and 70% of the total biomass of invertebrates in the Middle Atlantic Bight (Wigley and Theroux 1981), and for 12% of the number and 44% of the biomass of invertebrates in the offshore New England region (Theroux and Wigley[3]). In addition, several species support important fisheries (e.g., sea scallops, oysters, surf clams, ocean quahogs, and bay scallops), especially in the northeastern sector, which, in 1979, accounted for landings of bivalve meats totaling 151 million lb valued at $205.1 million (Pileggi and Thompson 1980).

Since 1955 the Benthic Dynamics Investigation of the National Marine Fisheries Service's (NMFS) Northeast Fisheries Center (NEFC) at Woods Hole, Mass. (U.S. Department of Commerce, NOAA), has been conducting ecological studies relating to benthic invertebrates and demersal fishes. As a result of intensive sampling for these studies we have accumulated a large collection of invertebrate specimens from inshore and offshore locations which are maintained in a Specimen Reference Collection (SRC). Bivalve specimens make up a significant and diverse portion of the Collection accounting for 225 separate taxa, with representatives from estuaries, embayments, the shoreline, the continental shelf, slope, and portions of the upper continental rise. Sampling depths represented range from 0 to nearly 4,000 m.

This report deals with the geographic and bathymetric distribution and occurrence, and relationship to bottom sediments of all taxonomic groups of bivalves in our collection. Geographic distribution of each taxon, along with a sketch of the shell, is presented in a series of charts, whereas depth distribution and occurrence and sedimentological relationships are in tabular form. Also included are: 1) author and date of generic descriptions from Neaves' "Nomenclator Zoologicus"; 2) the vernacular name of species when available; and 3) a reference to specific descriptions, the originals of which were examined and cited in the References section.

The bivalve taxa are discussed in systematic order in the body of the report (see Contents); however, for reference facility figures are arranged alphabetically by genus on the last pages, and are cross referenced by figure number within each taxonomic section.

MATERIALS AND METHODS

The Specimen Reference Collection contains over 108,000 specimens of bivalve mollusks, 81% of which were alive when captured. The taxonomic groups of bivalves represented include: 5 subclasses, 8 orders, 46 families, 99 genera, and 164 species. The specimens are contained in 10,465 lots obtained from 2,767 sampling sites located along the shore, in estuaries and embayments, and on the continental shelf and slope of the eastern coast of the United States between Canada and southern Florida (Fig. 1).

Twenty-one years are represented in these data from the Specimen Reference Collection; included are samples from collections made in 1903, 1904, 1950, 1953 through 1968, 1970, and 1971. Samples obtained from 1972 to the present are not included in this report.

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[3]Theroux, R. B., and R. L. Wigley. Quantitative composition and distribution of the macrobenthic invertebrate fauna of the New England Region. Manuscr. in prep. Northeast Fisheries Center Woods Hole Laboratory, National Marine Fisheries Service, NOAA, Woods Hole, MA 02543.

The majority of the lots analyzed were obtained by 15 research vessels; a small percentage of the lots did not have a vessel designated or were obtained by hand sampling along the shore, scuba diving, or other means. Among the collecting vessels were: *Fish Hawk*, *Gilbert*, *Harengus*, *Albatross III*, *Delaware I*, *Delaware II*, *Albatross IV*, and *Blueback*, all operated by the National Marine Fisheries Service (NMFS), or its predecessor agencies the Bureau of Commercial Fisheries (BCF) and the U.S. Fish Commission (USFC). There were four commercial fishing vessels chartered by BCF for research purposes: *Whaling City*, *Shirley* and *Roland*, *Silver Mink*, and *Priscilla V*. The *A. E. Verrill*, operated by the Marine Biological Laboratory (MBL), Woods Hole, Mass., and the *Gosnold* and *Asterias* of the Woods Hole Oceanographic Institution (WHOI), Woods Hole, Mass., also provided collections included in this report. Table 1 lists the pertinent sampling statistics for each vessel. Data pertaining to each lot of bivalves in the NEFC Specimen Reference Collection are contained in Theroux and Wigley[4]; information for each group includes: vessel name, cruise number, station number, type of sampling gear, latitude, longitude, sampling date, water depth in meters, and bottom type.

Bathymetry

Water depths, in meters, were obtained by means of depth sounders at sea and from published navigation charts or bathythermographic records where actual depth soundings were not available at time of sampling or for inshore collections. For ease of processing and to facilitate discussion of distribution with depth, depths were grouped into eight depth range categories. Range groupings used are: 1) 0-24m, 2) 25-49 m, 3) 50-99 m, 4) 100-199 m, 5) 200-499 m, 6) 500-999 m, 7) 1,000-1,999 m, and 8) 2,000-3,999 m.

Geology

Data for the majority of the samples contained information on 34 different types of bottom sediments. Considering the areal scope of this report, and the restrictions on legibility enjoined by the amount of reduction required to the base charts, we have grouped the 34 more detailed sediment types into 2 separate, more generalized, subgroups. The first subgroup used in the tables accompanying the taxon/sediment relations discussion, contains nine sediment categories: 1) gravel, 2) sand-gravel, 3) till, 4) shell, 5) sand-shell, 6) sand, 7) silty sand, 8) silt, and 9) clay. The second subgroup, used in the sediment distribution chart (Fig. 2), groups the above nine categories into four, more general, classes for ease of interpretation on the chart; thus, in the chart, sediment types are: 1) gravel, 2) shell, 3) sand, and 4) silt-clay.

Sampling Gear

A total of 28 different sampling devices were used in obtaining the bivalves in the NEFC collection. Among the devices are a variety of grab samplers, dredges, and trawls, various nets, and skimmers; in addition scuba divers, and hand collecting yielded specimens, and some were obtained from fish stomachs. Table 2 lists the various types of sampling gear used and the number and percent samples for each type.

Data Treatment

Original samples were preserved in buffered formaldehyde solution at sea and subsequently transfered to alcohol preservative when sorted in the laboratory. All information pertaining to these collections has been stored on magnetic tape at the NEFC.

Whenever possible an attempt was made to arrive at a determination at the species level for all lots examined; however, time and personnel constraints as well as damaged specimens necessitated the use of higher taxonomic levels in some cases. Consequently this report contains determinations at the familial and generic levels as well as those to the specific level.

BOTTOM SEDIMENTS

The following discussion on the distribution of bottom sediments over the entire sampling area is based on the information contained in Figure 2.

The predominant sediments in the study area are of the sandy and muddy (silt-clay) types. Sandy substrates occupy nearly the whole of the continental shelf and nearshore regions from Georges Bank to Key West, Fla. Muddy substrates predominate on the outer continental shelf and slope, in many of the embayments, and in the deeper basins of the Gulf of Maine.

Gravelly substrates are quite widely distributed primarily in the Gulf of Maine and are patchily distributed on the Southern New England shelf and in the Mid-Atlantic Bight region between Cape Cod and Cape Hatteras, becoming almost nonexistent below Cape Hatteras. No gravelly substrates occur south of Myrtle Beach, S.C.

Shelly substrates occur predominantly on the continental shelf south of Cape Fear, N.C., and in some nearshore areas in rather discrete patches. Two of these small patches of shelly sediments were also encountered along the northeastern coast of Maine and south of Grand Manan Island.

DISTRIBUTION OF CLASS BIVALVIA

The areal distribution of samples with regard to water depth is shown in Figure 1.

Occurrence frequency of samples in the various water depth ranges shows a decided affinity for the midcontinental shelf depths. Fully one-third (33.6%) of the samples are from water depths of 50 to 99 m gradually diminishing in frequency with both increasing and decreasing water depth range.

The number of bivalve specimens was significantly highest (41%) in the 50-99 m depth range grouping; about equal (17 and 16%) in the shallower depth range groupings, 0-24 and 25-49 m, as well as the 100-199 m grouping (16%); and gradually decreased with increasing depth range beyond 200 m. Table 3 lists the occurrence of bivalve samples and specimens in relation to range in water depth.

[4]Theroux, R. B., and R. L. Wigley. 1979. Collection data for U.S. east coast bivalve mollusks in the Northeast Fisheries Center Specimen Reference Collection Woods Hole, Massachusetts. Unpubl. manuscr., 471 p. Northeast Fisheries Center Woods Hole Laboratory, National Marine Fisheries Service, NOAA, Woods Hole, MA 02543.

The occurrence of samples containing bivalves was highest in sand and silty sand substrates, 32 and 13%, respectively. Next highest density of samples occurred in the finest grained substrates, silt (8%) and clay (7%). Areas of coarser grained sediments, gravel, shell, and sand-shell, each contained < 8% of the total number of samples, while sand-gravel sediments contained < 0.5% of the samples. Twenty-one percent of the samples are unclassified with regard to sediment type.

Specimen density in the various sediment types very closely approximates that of sampling intensity. Greatest numbers of organisms occurred in the sandy and muddy substrates with fewer in the coarse textured sediments. Table 4 lists the occurrence of bivalve samples and specimens in relation to bottom sediments.

The occurrence frequency of individual bivalve taxa adjusted for distribution of sampling intensity among the various depth range groupings or sediment types, although not tabulated herein, may be calculated from the data contained in Tables 3 and 4 for total samples, and Tables 6 through 327 for individual taxa.

SYSTEMATIC ARRANGEMENT

The systematic arrangement of R. T. Abbott (1974) has been, for the most part, followed in this report. The only exceptions involve the placement of families in the orders Veneroida and Pholadomyoida where we have followed the arrangement of N. D. Newell (in R. C. Moore, 1969a, vol. 1, p. N218).

There are 36 samples containing 76 specimens in our collection which we were only able to classify as Bivalvia. A variety of reasons necessitated this classification; the most common cause for failure to arrive at a lower taxonomic designation was lack of shell, especially of the smaller, thinner shelled species, whose hard parts were dissolved away by preservatives which were too acid. Another was shell structure so badly damaged that no definite determination, other than that of Bivalvia, could be made through examination of soft parts.

Further detailed discussion concerning this category would be pointless except to direct the interested reader's attention to the accompanying figures and tables which provide information about distributional and environmental parameters relating to areas where unidentifiable bivalve material was encountered. (See Fig. 21, and Tables 5, 6, 7; and Theroux and Wigley footnote 4, table 32.)

DISTRIBUTIONAL AND ECOLOGICAL DISCUSSION

Class BIVALVIA
Subclass PALAEOTOXODONTA
Order NUCULOIDA

The NEFC Specimen Reference Collection contains two specimens from two samples of organisms which are classified to the order level Nuculoida (Table 5).

One of the samples is from east of Cape Cod and the other sample is from Vineyard Sound, Mass. (Fig. 79; Theroux and Wigley footnote 4, table 134).

The depth of our samples is 15 and 103 m, placing them in two separate depth range groupings, each of which contained 50% of samples and specimens; the groupings concerned are the 0-24 m and the 200-499 m.

Only one sample contained information relating to bottom sediments; this sample was obtained from a clay substratum.

Family NUCULIDAE
Genus *Nucula* Lamarck 1799

***Nucula delphinodonta* Mighels and Adams 1842. Delphinula nut clam. Figure 71.**

The distribution of the delphinula nut clam extends from Labrador to Maryland on the east coast of the United States as well as being moderately well distributed in Arctic regions and in northern Europe (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1974).

This tiny bivalve is represented in our collection by 2,092 specimens from 145 samples (Table 5).

The NEFC samples range from the Scotian Shelf through the Gulf of Maine-Georges Bank complex onto the Southern New England shelf and the Mid-Atlantic Bight region south to the offing of Chesapeake Bay (Fig. 71; Theroux and Wigley footnote 4, table 123).

This species occupies the Boreal and Virginian provinces in eastern North America (Coomans 1962); Gosner (1971) placed it in the Boreal province.

The delphinula nut clam enjoys a fairly wide bathymetric range, occupying depths between 17 and 2,361 m (Clarke 1962).

The range in depth occupied by the samples in the NEFC collection is from 11 to 1,894 m with a mean of 197 m. The majority of both samples and specimens, 41 and 78%, respectively, are in the 50-99 m depth range grouping; considerably smaller amounts occur in other depth range groupings; abundance with increasing depth range is as follows: the 0-24 m depth range grouping contains 6% of the samples and 2% of the specimens; the 25-49 m grouping, 14% of the samples and 11% of the specimens; the 100-199 m grouping, 18 and 4%, respectively; the 200-499 m grouping, 14 and 2%, respectively; the 500-999 m grouping, 5 and 1%, respectively; and the 1,000-1,999 m depth range grouping contains 4% of the samples and 2% of the specimens (Table 8).

This bivalve was found in all of the sediment types considered in this report. Abundance with decreasing particle size is as follows: gravel contained 3% of the samples and 0.7% of the specimens; sand-gravel, 4 and 0.4%, respectively; till sediments, 4% of the samples and 0.8% of the specimens; shell contained 2% of the samples and 0.5% of the specimens; sand-shell contained 0.7% of the samples and 0.2% of the specimens; sand substrates, 24 and 16%, respectively; silty sand substrates contained the highest amounts, 29% for samples and 72% for specimens; silt contained 13% of the samples and 3% of the specimens; and clay substrates 20% for samples and 6% for specimens (Table 9). There are two samples containing six specimens which are unclassified with regard to sediment type.

***Nucula proxima* Say 1822. Atlantic nut clam. Figure 72.**

The range of the Atlantic nut clam is from Newfoundland to Florida and Texas and it also occurs at Bermuda (Johnson 1934; Morris 1951 and 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

This tiny bivalve is a common member of the Northeast U.S. bivalve fauna. It bears the honor of being the most

abundant member, at least in terms of specimens, of the NEFC Specimen Reference Collection which contains 12,091 specimens representing 11.1% of the entire collection; the specimens were obtained from 223 samples which represent 2% of the total number of samples in the collection (Table 5).

Our samples range nearly the entire length of the east coast continental shelf, beginning at the Scotian Shelf thence south to Jacksonville, Fla. (Fig. 72; Theroux and Wigley footnote 4, table 124).

The zoogeographic distribution of this species is Boreal, Virginian, and Carolinian (Coomans 1962); Gosner (1971) placed it in the Virginian province.

The Atlantic nut clam is quite widely distributed with regard to depth, ranging from approximately 1 to 805 m depth (Johnson 1934; Porter 1974).

The NEFC collection samples range in depth from 1 to 260 m with a mean of 48 m. Two depth range groupings vie for precedence in abundance of this organism; the 0-24 m depth range grouping contains 31% of the samples and 47% of the specimens, while the 50-99 m grouping contains 37% of the samples and 45% of the specimens; the 25-49 m grouping contains 27% of the samples and 7% of the specimens, while the 100-199 m grouping contains 5% of the samples and 0.8% of the specimens; the 200-499 m depth range grouping contains 0.9% of the samples and < 0.1% of the specimens (Table 10). There are 2 samples containing 18 specimens which do not have any depth information in their sampling data.

The Atlantic nut clam occupied all sediment types considered in this report in varying proportions. The majority of both samples and specimens occurred in sand substrates where 48% of the samples and 40% of the specimens were obtained; silty sand contained 17% of the samples and 33% of the specimens and clay contained 15% of the former and 22% of the latter. The abundance in the other sediment types, gravel, till, shell, sand-shell, and silt ranged from 10% to < 0.5% of the samples; silt contained < 4% of the specimens, all of the others contained < 1% of the specimens (Table 11). There are 9 samples containing 32 specimens which are unclassified with regard to sediment type.

***Nucula tenuis* Montagu 1808. Smooth nut clam. Figure 73.**

The smooth nut clam is widely distributed, being known from all Arctic seas and occurring in the North Atlantic as well as North Pacific Oceans. In the Atlantic it ranges from Labrador to Florida, also occurring at Greenland and in northern Europe, there it ranges south to Gibraltar and possibly into the Mediterranean; in the Pacific it ranges from Arctic seas to as far south as northern Japan and to Baja, California (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Clarke 1962; Tebble 1966; Abbott 1974).

Nucula tenuis is a common small bivalve which is represented in the NEFC collection by 2,031 specimens, representing 2% of the total number of specimens, from 215 samples which also represent 2% of the total number of samples (Table 5).

The NEFC samples occupy nearly the whole of the Gulf of Maine, the periphery of Georges Bank, ranging onto the continental shelf area in the Mid-Atlantic Bight region between Cap Cod, Mass., and Cape Hatteras, N.C. (Fig. 73; Theroux and Wigley footnote 4, table 125).

Ockelmann (1958) considered its distribution to be panarctic-boreal and stated that it is circumpolar; Coomans (1962) placed it in the Boreal, Virginian, and Celtic provinces, while Gosner (1971) placed it in the Boreal and Virginian provinces; Dance (1974) placed it in the Arctic, Boreal, Californian, Mediterranean, and Japonic provinces.

Nucula tenuis enjoys a widespread bathymetric range, occupying water depths from slightly offshore to rather deep water, ranging from 4 to 2,297 m (Clarke 1962).

The NEFC suite of samples ranges in depth between 16 and 2,365 m with a mean of 320 m. There were members of the smooth nut clam occupying all of the depth range groupings used in this report; however, two mid to outer continental shelf depth range groupings contain the majority of both samples and specimens. Forty-one percent of the samples are in the 100-199 m grouping and 24% of the samples are in the 50-99 m grouping while specimen abundance is greatest in the 50-99 m grouping with 55%, and 24% occurs in the 100-199 m grouping. Significantly smaller amounts occur in the other depth range groupings. The 0-24 m grouping contains 0.5% of the samples and < 0.1% of the specimens; 8% of the samples and 4% of the specimens are in the 25-49 m grouping; there is 8% of the samples in the 200-499 m and 500-999 m groupings which contain 3 and 5%, respectively, for specimens; the 1,000-1,999 m depth range grouping contains 9% of the samples and 10% of the specimens; the 2,000-3,999 m depth range grouping contains 1% of the samples and 0.4% of the specimens (Table 12).

As with depth, the smooth nut clam occurred in all sediment types considered in this report. The distribution of both samples and specimens with decreasing particle size is as follows: 3% of the samples and 0.5% of the specimens occurred in gravel; sand-gravel contained 6% of the samples and 4% of the specimens; till substrates 3 and 0.8%, respectively; shell, 1% of the samples and 1% of the specimens; sand-shell, 0.5% of the samples and 0.1% of the specimens; sand substrates contained 18 and 8%, respectively; silty sand, which contained the greatest abundance, yielded 36 and 36%, respectively, while silt contained 16% of the samples and 20% of the specimens; the finest substrate, clay, contained 18% of the samples and 29% of the specimens (Table 13). There are 15 samples containing 75 specimens which are unclassified with regard to sediment type.

***Nucula* sp. Figure 74.**

There are 961 specimens from 108 samples in the NEFC collection which bear the designation *Nucula* sp., members of the nut shell group (Table 5).

The distribution of samples containing members of this taxon of primarily deep water organisms ranges from off Nova Scotia south to Florida; however, there is one grouping of samples in the Gulf of Maine and the inshore waters of the Cape Cod region, and another off the Georgia Coast which are decidedly more inshore than the majority of samples (Fig. 74; Theroux and Wigley footnote 4, table 126).

The depth distribution for this taxon in the NEFC collection ranges from 13 to 2,722 m with a mean of 896 m. In terms of depth range groupings the majority of both samples and specimens follow the geographic distribution in that they occur in the 1,000-1,999 m grouping which contains 28% of the samples and 38% of the specimens. In terms of increasing depth range grouping the distribution of samples and specimens is as follows: the 0-24 m depth range grouping contains

3% of the samples and 15% of the specimens; the 25-49 m grouping, 10% of the former and 2% of the latter; the 50-99 m grouping contains 7 and 2%, respectively, while the 100-199 m grouping contains 12% of the samples and 20% of the specimens; the 200-499 m grouping contains 16 and 3%, respectively; the 500-999 m grouping 12 and 11%, respectively, and the deepest grouping, 2,000-3,999 m, contains 12% of the samples and 10% of the specimens (Table 14).

Shell was the only sediment type which did not contain any members of this taxon. In terms of decreasing particle size, distribution of samples and specimens is as follows: gravel contained 1% of the samples and 0.3% of the specimens; sand-gravel 2 and 19%, respectively; till substrates 1 and 2%, respectively, while sand-shell contained 6% of the samples and 2% of the specimens; sand sediments contained 17% of the samples and 5% of the specimens, while silty sand was equal with 30% for samples and specimens; silt contained the largest amounts of both samples and specimens with 32 and 37%, respectively, while the finest substrate, clay, contained 12% of the samples and 6% of the specimens (Table 15). There are 4 samples containing 200 specimens which are unclassified with regard to sediment type.

Family MALLETIIDAE
Genus *Malletia* Des Moulins 1832

***Malletia obtusa* G. O. Sars 1872. Blunt nutshell. Figure 60.**

This nutshell is distributed from off Massachusetts to North Carolina in the western Atlantic and from Norway to off West Africa in the eastern Atlantic; it is also quite widely distributed in the Arctic and occurs in the Mediterranean and the Cape Verde Islands as well as the Canary Islands (Johnson 1934; Ockelmann 1958; Clarke 1962; Morris 1973; Abbott 1974).

The blunt nutshell is a deep water inhabitant which is represented by 145 specimens from 38 samples in the NEFC collection (Table 5).

Our samples are from the continental slope and upper continental rise between Nova Scotia and Cape Hatteras, N.C. (Fig. 60, Theroux and Wigley footnote 4, table 105).

The bathymetric range for this organism is 366 to 3,259 m (Johnson 1934; Clarke 1962).

The NEFC sample suite is from water depths ranging between 1,045 to 2,975 m with a mean of 1,998 m.

Fifty-three percent of the samples and 66% of the specimens are in the 1,000-1,999 m depth range grouping, and 47% of the samples and 34% of the specimens are in the 2,000-3,999 m grouping (Table 16).

Due to the deep dwelling habits of this species they were only found in sediment types of small particle size. The majority of samples (53%) and specimens (62%) occurred in silt. Clay substrates contained 26% of the samples and 21% of the specimens, and silty sand substrates contained 21% of the samples and 17% of the specimens (Table 17).

Genus *Saturnia* Sequenza 1877

***Saturnia subovata* Verrill and Bush 1897. Ovate nut shell. Figure 97.**

This species is distributed from Nova Scotia to North Carolina (Johnson 1934; La Rocque 1953; Morris 1973).

Saturnia subovata is represented in the NEFC Specimen Reference Collection by 70 specimens from 22 samples (Table 5).

The NEFC samples are from the upper continental slope on the northeast peak of Georges Bank to the region between Delaware and Chesapeake Bays (Fig. 97; Theroux and Wigley footnote 4, table 171).

Johnson (1934) and La Rocque (1953) reported the depth range for this species as extending from 229 to 3,168 m.

Our samples are from deep water between 650 and 2,520 m with a mean of 1,911 m. The 500-999 m depth range grouping contains 5% of the samples and 4% of the specimens, while the 1,000-1,999 m grouping contains 46% of the samples and 57% of the specimens; the 2,000-3,999 m grouping contains 50% of the samples and 39% of the specimens (Table 18).

The ovate nut shell was found in the finer grained sediment types. Twenty-three percent of the samples and 23% of the specimens occurred in silty sand, while 64% of the samples and 59% of the specimens were found in silt; clay substrates contained 14% of the samples and 19% of the specimens (Table 19).

Family NUCULANIDAE

There are 98 samples in the NEFC collection containing 834 specimens which are classified to the family level of Nuculanidae (Table 5).

The samples containing this taxon range from the upper continental slope and lower continental shelf off Atlantic City, N.J., to south of Miami, Fla. (Fig. 79; Theroux and Wigley footnote 4, table 133).

Our samples range in depth from 45 to 2,680 m with a mean of 404 m. The majority of both samples (56%) and specimens (73%) are in the 200-499 m depth range grouping and diminish on either side of this grouping with increasing and decreasing water depth range. The 100-199 m grouping contains 10% of the samples and 18% of the specimens, the 50-99 m grouping, 4% of the samples and 1% of the specimens, and the 25-49 m grouping, the shallowest in which they are grouped, contains 3% of the samples and 0.5% of the specimens, the 500-999 m grouping contains 25% of the samples and 8% of the specimens, and the 2,000-3,999 m grouping contains 2% of the samples and 0.4% of the specimens (Table 20).

Members of this taxon were absent from two sediment types, sand-gravel and till. The majority of both samples and specimens occurred in sand, where 34% of the former, and 38% of the latter were found; silty sand substrates contained 29% of the samples, and 36% of the specimens, while silt substrates contained 20% of the former and 19% of the latter; the finest grained substrate, clay, contained 2% of the samples and 0.4% for specimens; sand-shell substrates contained 10% of samples and 4% of the specimens, while shell contained 2% for samples and 2% for specimens; the coarsest substrate, gravel, contained 3% for samples and 1% for specimens (Table 21).

Genus *Nuculana* Link 1807

***Nuculana acuta* (Conrad 1831). Pointed nut clam. Figure 75.**

The pointed nut clam is found in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Cape Cod to Texas and the West Indies, and on to Brazil, while in

the Pacific it ranges from the Aleutian Islands to the Gulf of California (Johnson 1934; La Rocque 1953; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

This species, which is often very common in offshore areas, is represented by 352 specimens from 59 samples in our collection (Table 5).

The NEFC samples range from the continental shelf break south of Nantucket Shoals to the Mid-Atlantic Bight region (Fig. 75; Theroux and Wigley footnote 4, table 127).

Coomans (1962) placed this species in the Virginian, Carolinian, and Caribbean provinces, while Gosner (1971) placed it in the Virginian province.

The depth distribution of this specifies ranges from +1 to 412 m (Johnson 1934; Porter 1974).

Our samples are from depths ranging between 82 and 366 m with a mean of 149 m. The majority of both samples and specimens are in the 100-199 m depth range grouping which contains 80% of the samples and 90% of the specimens; the 50-99 m grouping contains 15% of the samples and 7% of the specimens, while the 200-499 m grouping contains 5% of the samples and 3% of the specimens (Table 22).

Silty sand substrates contained the majority of both samples and specimens with 42% of the former and 49% of the latter occurring in this sediment type; sand contained 34% of the samples and 38% of the specimens, while clay contained 19% of the samples and 11% of the specimens; the least preferred sediment type was silt where 5% of the samples and 2% of the specimens occurred (Table 23).

***Nuculana carpenteri* (Dall 1881). Carpenter's nut clam. Figure 75.**

This species ranges from North Carolina to the West Indies (Johnson 1934; Morris 1973; Abbott 1974).

This is an uncommon bivalve of which the NEFC collection contains 45 specimens from 17 samples (Table 5).

Our samples are located at the continental shelf break between Cape Hatteras, N.C., and Key West, Fla. (Fig. 75; Theroux and Wigley footnote 4, table 128).

Although this species prefers deep water (Morris 1973), it ranges between 18 and 525 m depth (Abbott 1974).

Our samples range in depth between 140 and 400 m of water with a mean of 254 m. The 200-499 m depth range grouping contains the largest amounts of samples (82%) and specimens (89%); the 100-199 m grouping contains 18% of the samples and 11% of the specimens (Table 24).

Carpenter's nut clam was found in three sediment types within the study area. The majority of samples and specimens occured in silt, yielding 41 and 62%, respectively; silty sand sediments contained 41% of the samples and 22% of the specimens, and sand contained 18% of the samples and 16% of the specimens (Table 25).

***Nuculana caudata* (Donovan 1801). Tailed nut shell. Figure 75.**

Johnson (1934) and Abbott (1974) reported this species as occurring from the Gulf of Maine to Virginia.

Nuculana caudata is uncommon in the region; the NEFC collection contains two specimens from one sample (Table 5).

Our sample is from the western tip of Browns Bank in the Gulf of Maine (Fig. 75; Theroux and Wigley footnote 4, table 129).

The tailed nut shell is a moderately deep water inhabitant, ranging in depth from 187 to 1,173 m (Johnson 1934; Abbott 1974). The NEFC sample is from a water depth of 253 m. This depth range places it in the 200-499 m depth range grouping.

Our sample was obtained in a substrate of till.

***Nuculana pernula* (Müller 1771). Müller's nut clam. Figure 76.**

Müller's nut clam is distributed throughout the northern sections of both the Atlantic and Pacific Oceans. In the Atlantic it ranges from the Arctic Ocean to Cape Cod, Mass., while in the North Pacific it ranges from northern Alaska to Chatham Sound, British Columbia; it is also found in eastern Siberia (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973).

Nuculana pernula is a common bivalve of northern waters; our collection contains 320 specimens from 199 samples (Table 5).

The NEFC samples are from the Gulf of Maine region with a few straggling samples on the northern part of Georges Bank (Fig. 76; Theroux and Wigley footnote 4, table 130).

Ockelmann (1958) considered this species to be panarctic-boreal in its distribution, while Gosner (1971) placed it in the Boreal province.

Müller's nut clam enjoys a rather widespread bathymetric range being found in water depths ranging between 3 and 1,643 m (Ockelmann 1958; Porter 1974).

Our samples are from water depths ranging from 46 to 611 m with a mean of 145 m. Distribution with increasing depth range is as follows: 3% of the samples and 3% of the specimens are in the 25-49 m depth range grouping, 34% of the samples and 51% of the specimens are in the 50-99 m grouping, 41% of the samples and 32% of the specimens in the 100-199 m grouping, 22% of the samples and 14% of the specimens in the 200-499 m grouping, < 1% of both samples and specimens are in the 500-999 m grouping (Table 26).

This species was found in all of the sediment types considered in this report. Sixteen percent of the samples and 17% of the specimens occurred in gravel, while sand-gravel contained 1% of the samples and 0.3% of the specimens; till substrates contained 24% of the samples and 21% of the specimens, while shell contained 2% of both samples and specimens; sand-shell substrates contained 3% of the samples and 2% of the specimens, sand substrates 8% of the former and 5% of the latter, with silty sand containing 14% samples and 26% of the specimens; the two finest grained substrates, silt, contained 8% of the samples and 4% of the specimens, and clay contained 25% of the samples and 25% of the specimens (Table 27). There are 6 samples containing 14 specimens which are unclassified with regard to sediment type.

***Nuculana tenuisulcata* (Couthouy 1838). Thin nut clam. Figure 77.**

The thin nut clam is distributed from Arctic seas and the Gulf of St. Lawrence to Rhode Island (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1974).

Nuculana tenuisulcata is the most common *Nuculana* of New England; it is represented in the NEFC Specimen Reference Collection by 469 specimens from 129 samples (Table 5).

The NEFC samples are distributed on the continental shelf, from around Nova Scotia, south into the Gulf of Maine (Fig. 77; Theroux and Wigley footnote 4, table 131).

Gosner (1971) placed this species in the Boreal province.

The bathymetric range of this species is from just below tide mark level to 275 m (Abbott 1974).

The samples in the NEFC collection range in depth between 38 and 366 m with a mean of 159 m. The majority of both samples and specimens are in the 100-199 m depth range grouping which contains 44% of the samples and 40% of the specimens; the 200-499 m grouping contains 29% of the samples and 31% of the specimens, while the 50-99 m grouping contains 23 and 27%, respectively; the smallest amounts of both samples and specimens are in the 25-49 m grouping with 4% of the former and 3% of the latter (Table 28).

Among the nine sediment types considered in this report, shell was the only one which did not contain any members of this species. In order of decreasing particle size, distribution of samples and specimens is as follows: 8% of the samples and 6% of the specimens occurred in gravel, 7% of the former and 3% of the latter in sand-gravel, while till contained 21% of the samples and 33% of the specimens; sand-shell substrates contained < 1% of the samples and 1% of the specimens, sand, 6% of the former and 3% of the latter; silty sand substrates, however, contained 28% of the samples and 29% of the specimens; the two finest grained substrates, silt and clay, contained 8 and 21%, respectively, for samples, and 9 and 17%, respectively, for specimens (Table 29). There are 9 samples containing 55 specimens which are unclassified with regard to sediment type.

***Nuculana* sp. Figure 78.**

The NEFC Specimen Reference Collection contains 448 specimens from 84 samples which are identified to the generic level of *Nuculana* sp. (Table 5).

Samples containing members of this genus are distributed from the central Gulf of Maine south to Key West, Fla., with a major gap occurring in the Middle Atlantic Bight Region (Fig. 78; Theroux and Wigley footnote 4, table 132).

The NEFC samples range in depth from 15 to 458 m of water with a mean of 141 m. The distribution of samples and specimens among the various depth range groupings is as follows: 2% of the samples and 0.7% of the specimens are in the 0-24 m depth range grouping, while 12% of the former and 4% of the latter are in the 25-49 m grouping. The 50-99 m grouping contains 21% of the samples and 61% of the specimens, with the 100-199 m grouping containing 42% of the former and 28% of the latter; the last depth range grouping in which these organisms are arrayed is the 200-499 m depth range grouping which contains 23% of the samples and 7% of the specimens (Table 30).

No member of this genus was found in either sand-gravel or till substrates; however, specimens were found in all other substrate types considered in this report. In order of decreasing particle size, the samples and specimens were distributed as follows: gravel contained 2% of the samples and 3% of the specimens, shell, 2% of the former and 1% of the latter; sand-shell substrates contained 17% of the samples and 28% of the specimens, while sand contained 24% of the former and 43% of the latter; silty sand contained 39% of the samples and 22% of specimens, silt, 1% for samples, 0.2% for specimens, and clay, the finest grained sediment type, contained 13% of the samples and 4% of the specimens (Table 31). There are two samples containing two specimens which are unclassified with regard to sediment type.

Genus *Yoldia* Möller 1842

***Yoldia limatula* (Say 1831). File yoldia. Figure 117.**

This species is widely distributed, occuring in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from the Gulf of St. Lawrence and Nova Scotia, south to North Carolina, while in the Pacific it ranges from Alaska south to San Diego, Calif.; it also occurs in the eastern Atlantic (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

The file yoldia is represented in the NEFC collection by 375 specimens from 37 samples (Table 5), from the northern sector of the study area, ranging from off the coast of Maine, in the Gulf of Maine, on the southeastern part of Georges Bank, but primarily inshore from the Cape Cod region south into Chesapeake Bay (Fig. 117; Theroux and Wigley footnote 4, table 210).

The zoogeographic distribution of this species is in the Boreal and Virginian provinces according to Coomans (1962) and Gosner (1971); Dance (1974) placed it in the Transatlantic and Boreal provinces in eastern North America, and in the Arctic province.

This species is primarily a shallow water inhabitant, occupying water depths from just below the low water mark in bays and inlets in nearshore areas out to approximately 23 m (Abbott 1968, 1974; Porter 1974).

Our samples are from water depths which range from 0 to 121 m with a mean of 29 m. The majority of both samples and specimens are in the shallower depth range groupings with 60% of the samples and 64% of the specimens occurring in the 0-24 m grouping and 30% of the samples and 29% of the specimens in the 25-49 m grouping; the 50-99 and 100-199 m groupings each contain 5% of the samples and 6.7% and 0.5% of the specimens, respectively (Table 32).

Morris (1973) and Emerson et al. (1976) both reported this species as a mud bottom inhabitant.

Our samples were obtained from the finer grained sediments which ranged from sand down to clay. Sand contained 70% of the samples and 40% of the specimens; silty sand substrates yielded 23% of the samples and 22% of the specimens, while silt and clay each contained 3% of the samples but 38% and 0.3% of the specimens, respectively (Table 33). There are 7 samples containing 33 specimens which are unclassified with regard to sediment type.

***Yoldia myalis* (Couthouy 1838). Comb yoldia. Figure 118.**

The comb yoldia is found in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Hudson Strait in Labrador to Massachusetts while in the Pacific it ranges from Alaska to Puget Sound, Wash. (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1974).

There are 47 specimens of this species in the NEFC collection from 21 samples (Table 5).

Our samples are from the Scotian Shelf and along the coast of Maine (Fig. 118; Theroux and Wigley footnote 4, table 211).

The comb yoldia is an inhabitant of the Boreal province (Gosner 1971).

The depth distribution of this species is from moderately shallow water to approximately 146 m (Morris 1973; Abbott 1974).

Our samples are from depths which range between 7 and 100 m with a mean of 72 m. The majority of both samples and specimens are in the 50-99 m depth range grouping, which contains 81% of the samples and 87% of the specimens; the 25-49 m grouping contains 10% of the samples and 4% of the specimens, while each of the 0-24 m and 100-199 m groupings contain 5% of the samples but 6 and 2%, respectively, for specimens (Table 34).

Morris (1973) indicated that this species prefers muddy substrates. Our samples were obtained from nearly all the sediment types considered in this report with the exception of sand and clay. Abundances of samples and specimens with regard to sediment type are as follows: gravel substrates contained 33% of the samples and 25% of the specimens, while sand-gravel yielded 28% of the samples and 32% of the specimens; three sediment types, till, silty sand, and silt, each contained 6% of the samples but 2.3% of the specimens for both till and silty sand, and 7% of the specimens occurred in silt; both shell and sand-shell each contained 11% of the samples and 27 and 5% of the specimens, respectively (Table 35). There are three samples containing three specimens which are unclassified with regard to sediment type.

***Yoldia regularis* Verrill 1884. Figure 118.**

Published distributional information for this species shows it to occur from Newfoundland to off Martha's Vineyard, Mass. (Johnson 1934; Ockelmann 1958; Abbott 1974).

There are 43 specimens from 6 samples of this species in the NEFC Specimen Reference Collection (Table 5). The NEFC suite of samples is from the Gulf of Maine, ranging from south of Grand Manan Island south to Cape Cod Bay (Fig. 118; Theroux and Wigley footnote 4, table 212).

Both Johnson (1934) and Gosner (1971) listed the depth range for this species as being 179 to 639 m.

The NEFC samples are from water depths which range between 44 and 142 m with a mean of 83 m. The 50-99 m depth range grouping contains 82% of the samples and 76% of the specimens, while each of the 25-49 m and 100-199 m groupings contain 9% of the samples but 2 and 21%, respectively, of the specimens (Table 36).

Specimens of *Yoldia regularis* were obtained from three sediment types, all of which were the finer grained substrates. The majority of samples were in silty sand which contained 55% of the samples, but only 21% of the specimens; silt, however, while containing 36% of the samples provided the majority of specimens 57%; clay sediments contained 9% of the samples and 21% of the specimens (Table 37).

***Yoldia sapotilla* (Gould 1841). Short yoldia. Figure 119.**

This species, although primarily a northern or Arctic inhabitant ranges from Arctic seas and Labrador and Newfoundland to approximately North Carolina (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974).

Yoldia sapotilla is common and is represented in the NEFC collection by 279 samples, constituting 2.5% of the total number of samples, containing 2,128 specimens or nearly 2% of the total number of specimens (Table 5). The NEFC samples occur in the Gulf of Maine and Georges Bank with a large concentration of them on the Southern New England shelf and upper slope regions ranging south to approximately north and east of the entrance to Chesapeake Bay (Fig. 119; Theroux and Wigley footnote 4, table 213).

Coomans (1962) reported this species as an Arctic, Boreal, and Virginian province inhabitant, while Gosner (1971) placed it in the Boreal and Virginian provinces.

This species is considered to be a moderately deep water inhabitant occupying depths which range between 7 and 250 m (Abbott 1968; Porter 1974).

Our samples are from depths which range between 15 and 421 m with a mean of 109 m. The majority of both samples and specimens are in the 50-99 m depth range grouping which contains 55% of the samples and 66% of the specimens; the 100-199 m grouping contains 21% of the samples and 17% of the specimens, while the 200-499 m grouping contains 14% of the samples and 8% of the specimens, smaller amounts are in the shallower depth range groupings, 0-24 and 25-49 m which contain 0.7 and 10%, respectively, for samples and 0.1 and 8.2%, respectively, for specimens (Table 38). There is 1 sample containing 148 specimens for which no depth information is available.

Morris (1951) and Abbott (1968) both reported this species as normally found in mud habitats.

The only sediment type considered in this report in which this species was not found was gravel; it did, however, prefer the finer grained substrates over the coarser ones. Abundances in terms of decreasing particle size are as follows: sand-gravel substrates contained 0.4% of the samples and < 0.1% of the specimens, till substrates, 5% of the samples and 3% of the specimens, shell substrates, 0.4% of the samples and < 0.1% of the specimens, while sand-shell substrates contained 0.7% of the samples and 0.2% of the specimens; sand, however, contained 28% of the samples and 25% of the specimens, while silty sand contained 33% of the samples and 38% of the specimens; silt substrates contained 6% of the samples and 7% of the specimens, while clay contained 26% of the samples and 27% of the specimens (Table 39). There are 9 samples containing 158 specimens which are unclassified with regard to sediment type.

***Yoldia thraciaeformis* Storer 1838. Broad yoldia. Figure 120.**

The broad yoldia occurs in both the Atlantic and Pacific Oceans; in the Atlantic it is distributed from the Arctic Ocean and Greenland to the New England coast at Massachusetts; in the Pacific it ranges from the Arctic Ocean to Puget Sound, Wash. (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974).

Yoldia thraciaeformis is moderately common and is represented in the NEFC collection by 158 specimens from 46 samples (Table 5).

The NEFC samples are from the western portion of the Gulf of Maine ranging from south of Grand Manan Island south into Cape Cod Bay (Fig. 120; Theroux and Wigley footnote 4, table 214).

Coomans (1962) reported the distribution of this species to be in the Arctic, Boreal, and Virginian provinces while Gosner (1971) placed it in the Boreal province. The depth distribution of this species ranges from shallow to deep water with a range of approximately 18 to 418 m (Johnson 1934; Abbott 1974; Porter 1974).

Our samples are from water depths which range between 46 and 271 m with a mean of 98 m. The majority of both samples and specimens are in the 50-99 m depth range grouping which contains 65% of the samples and 73% of the specimens, while 26% of the samples and 23% of the specimens are in the 100-199 m grouping; both the 25-49 and 200-499 m groupings contain 4% of the samples and 1.3 and 1.9% of the specimens, respectively (Table 40).

Morris (1973) reported that *Yoldia thraciaeformis* is normally found in mud substrates.

The majority of our samples and specimens occurred in clay substrates which contained 49% of the samples and 42% of the specimens while silt and silty sand substrates each contained 12% of the samples, but 34 and 8%, respectively, of the specimens. Other sediment types in which *Yoldia thraciaeformis* were found were till with 24% of the samples and 15% of the specimens and gravel which contained 2% of the samples and specimens (Table 41). There are 5 samples containing 14 specimens which are unclassified with regard to sediment type.

***Yoldia* sp. Figure 121.**

The NEFC Specimen Reference Collection contains 303 specimens of bivalves from 88 samples which, since many specimens had badly broken and/or eroded shells precluding exact classification, were identified only to the generic level *Yoldia* sp. (Table 5).

Samples containing members of the genus *Yoldia* are from the Gulf of Maine region extending from the Nova Scotian shelf to Cape Cod; there is also a group occurring on the outer continental shelf and upper slope from south of Cape Cod, Mass., into Long Island Sound (Fig. 121; Theroux and Wigley footnote 4, table 215).

The range of depth for these samples is 20 to 1,480 m with a mean of 196 m. The majority of both samples and specimens are in mid to lower continental shelf depth range groupings with the bulk in the 100-199 m grouping which contains 43% of the samples and 51% of the specimens; the 200-499 m grouping contains 35% of the samples and 25% of the specimens, while the 50-99 m grouping contains 15% of the samples and 20% of the specimens; 5% of the samples and 2% of the specimens are in the 25-49 m grouping and each of the 0-24 m and 1,000-1,999 m groupings contain 1% of the samples and 0.7 and 1.3%, respectively, of the specimens (Table 42).

As with other members of this group the fine sediment types were preferred over the coarser ones with the majority of both samples (34%) and specimens (40%) occurring in clay substrates; silty sand substrates accounted for 31% of both samples and specimens, while silt contained 12% of the samples and 11% of the specimens; both till and sand substrates each contained 10% of the samples, but 6 and 7%, respectively, for the specimens, and the coarsest fractions, sand-gravel and gravel, contained 2.4 and 1.2%, respectively for samples and 5 and 0.4%, respectively, for specimens (Table 43). There are 5 samples containing 31 specimens which are unclassified with regard to sediment type.

Genus *Portlandia* Moerch 1857.

***Portlandia fraterna* (Verrill and Bush 1898). Figure 92.**

This species is widely distributed throughout Arctic regions and also ranges from the Gulf of St. Lawrence to off Georgia; it is also found in northern Eurasia and in Norway (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1974).

There are three samples containing five specimens of this tiny bivalve in the NEFC collection (Table 5).

The NEFC samples are from the Gulf of Maine (Fig. 92; Theroux and Wigley footnote 4, table 160).

Ockelmann (1958) reported that this species is probably panarctic and that it is abyssal in the North Atlantic only; Gosner (1971) placed it in the Boreal and Virginian provinces.

The reported depth range for *Portlandia fraterna* is from 5.5 to 2,943 m (Johnson 1934; Clarke 1962; Abbott 1974).

The range in depth of our samples is 183 to 211 m with a mean of 196 m. The 100-199 m depth range grouping contains 67% of the samples and 60% of the specimens, while the only other depth range, the 200-499 m grouping, contains 33% of the samples and 40% of the specimens (Table 44).

Samples containing *Portlandia fraterna* were found in silty sand and clay sediments; the former contained 67% of the samples and 60% of the specimens, the latter 33% of the samples and 40% of the specimens (Table 45).

***Portlandia frigida* (Torell 1859). Figure 92.**

The presence of this small bivalve is questionable in our waters according to Ockelmann (1958). He questioned the occurrence of this species in New England waters as reported by Verrill (1882a), and Verrill and Bush (1898), stating that it is truly high Arctic in distribution. Pending a revision of the group, and since our specimens agree with other investigator's descriptions and figures, we will tentatively maintain it as presently identified.

According to reports we have seen, this species is thought to range from Arctic seas and the Gulf of St. Lawrence to Massachusetts (Johnson 1934; La Rocque 1953; Clarke 1962; Abbott 1974). However, Ockelmann, as stated above, considered it to occur only in Arctic regions and listed a fairly widespread distribution for it there.

There are five specimens from three samples of this species in the NEFC collection (Table 5). Our samples are from the Gulf of Maine north and east of Cape Cod (Fig. 92; Theroux and Wigley footnote 4, table 161).

The depth range for this species is between 6 and 2,297 m (Clarke 1962; Abbott 1974).

The NEFC samples are from depths which range between 55 and 213 m with a mean of 160 m. The samples are grouped in two depth range groupings, the 50-99 m, which contains 33% of the samples and 20% of the specimens, and the 200-499 m grouping which contains 67% of the former and 80% of the latter (Table 46).

Thirty-three percent of our samples and 60% of our specimens occurred in silty sand sediments, while 67% of the samples and 40% of the specimens occurred in clay substrates (Table 47).

***Portlandia inconspicua* (Verrill and Bush 1898). Inconspicuous yoldia. Figure 92.**

This species is distributed in the Arctic and occurs from Nova Scotia to North Carolina in the northwestern Atlantic (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1974).

The inconspicuous yoldia is represented by three specimens from one sample in our collection (Table 5).

Our sample is from the continental shelf south of Nantucket Shoals (Fig. 92; Theroux and Wigley footnote 4, table 162).

This species occupies water depths which range between 183 to 1,290 m (Abbott 1974).

Our sample is from a water depth of 59 m. This depth places it in the 50-99 m depth range grouping.

The sample in the NEFC collection was obtained in a sand sediment.

***Portlandia inflata* (Verrill and Bush 1897). Inflated yoldia. Figure 93.**

This species normally occurs from off Massachusetts to North Carolina (Johnson 1934; Clarke 1962; Abbott 1974).

The inflated yoldia is represented in the NEFC collection by 197 specimens obtained from 24 samples (Table 5).

The majority of samples in the NEFC collection are from north and east of Cape Cod in the Gulf of Maine; however, there are two samples on the outer continental shelf and upper slope south of Nantucket Shoals (Fig. 93; Theroux and Wigley footnote 4, table 163).

The depth range for this species is between 73 and 2,943 m (Abbott 1974).

Our samples are from depths which range between 55 and 458 m with a mean of 259 m. The largest amounts of both samples and specimens are in the 200-499 m depth range grouping which contains 75% of the samples and 92% of the specimens; the 50-99 m grouping contains 21% of the samples and 6% of the specimens, and the 100-199 m grouping contains 4% of the former and 2% of the latter (Table 48).

The greatest number of samples (50%) occurred in clay substrates; however, the largest number of specimens occurred in sand-gravel which contained 65% of the specimens but only 17% of the samples; clay sediments contained 20% of the specimens; other sediment types in which this organism was found were till, with 4% of the samples, and 0.5% of the specimens, and silt which contained 25% of the samples and 13% of the specimens (Table 49).

***Portlandia iris* (Verrill and Bush 1897). Iris yoldia. Figure 94.**

This species occurs from the Gulf of St. Lawrence to North Carolina as well as being distributed in some sections of the Arctic (Johnson 1934; La Rocque 1953; Ockelmann 1958; Morris 1973; Abbott 1974).

The NEFC Specimen Reference Collection contains 334 specimens of the iris yoldia from 47 samples (Table 5).

The NEFC samples are principally from the Gulf of Maine region, but four samples occur on the upper continental slope off Long Island, N.Y. (Fig. 94; Theroux and Wigley footnote 4, table 164).

Gosner (1971) placed this species in the Boreal and Virginian zoogeographic provinces.

Published reports on the depth distribution of this species list it as occurring between 37 and 2,928 m (Gosner 1971; Abbott 1974).

The range in depth of our samples is between 15 and 376 m with a mean of 191 m. There is a gradual diminution in the abundance of both samples and specimens with decreasing water depth with regard to depth range groupings. The majority of samples (55%) and specimens (61%) are in the 200-499 m depth range grouping, while the 100-199 m grouping contains 28% of the samples and 26% of the specimens; the 50-99 m grouping contains 15% of the samples and 13% of the specimens, while the shallowest depth range grouping, 0-24 m, contains only 2% of the samples and 0.3% of the specimens (Table 50).

Our data show that this species prefers finer grained sediments to the coarser ones with the majority of both samples and specimens occurring in the three finest grained sediments, clay, silt, and silty sand: clay contained 30% of the samples and 38% of the specimens, silt sediments contained 15% of the samples and 13% of the specimens, while silty sand substrates contained 28% of the samples and 35% of the specimens. Sand substrates contained 7% of the samples and 7% of the specimens, till 15% of the samples and 5% of the specimens, gravel, the coarsest, contained only 4% for samples and 2% for specimens (Table 51). One sample containing three specimens is unclassified with regard to sediment type.

***Portlandia lenticula* (Möller 1842). Figure 94.**

The widest distribution of this species occurs in Arctic regions according to Ockelmann (1958) where he considered it to be panarctic and possibly circumpolar. In Boreal areas it occurs north of Cape Cod, Mass. (Johnson 1934; Abbott 1974).

This is a rather uncommon species of which there are four specimens from four samples in our collection (Table 5).

Our samples are from the Gulf of Maine and Massachusetts Bay (Fig. 94; Theroux and Wigley, footnote 4, table 165).

Johnson (1934) and Abbott (1974) reported the depth range for this species in southerly regions to be from 201 to 223 m, while Ockelman (1958), giving the depth distribution for northern regions, listed it as occurring from 0 to 1,400 m.

Our samples are from water depths which range between 59 and 265 m with a mean of 122 m. The 50-99 m depth range grouping contains 75% each of samples and specimens, while the 200-499 m grouping contains 25% of each (Table 52).

The distribution of samples and specimens with regard to sediment type is similar to that which occurred for depth range in that 75% of both samples and specimens occurred in one sediment type, silty sand, while 25% of each occurred in silt (Table 53).

***Portlandia lucida* (Lovén 1846). Lucid yoldia. Figure 95.**

The lucid yoldia is distributed from Greenland to North Carolina in the Northwest Atlantic and from Norway to the Mediterranean in European waters, as well as being widespread throughout Arctic regions (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Tebble 1966; Morris 1973; Abbott 1974).

Portlandia lucida is uncommon to rare; it is represented in the NEFC collection by 161 specimens from 27 samples (Table 5).

Our samples are distributed in the Gulf of Maine to the north and east of Cape Cod, Mass. (Fig. 95; Theroux and Wigley footnote 4, table 166).

The main distribution of this species according to Ockelmann (1958) is low Arctic-boreal, and Mediterranean-Atlantic, and is abyssal in the North Atlantic only; Gosner (1971) placed it in the Boreal and Virginian provinces.

The lucid yoldia is an inhabitant of moderately deep water occupying depths which range between 28 and 2,943 m (Clarke 1962).

The samples in the NEFC collection are from waters which range in depth between 10 and 366 m with a mean of 167 m. The occupation of moderately deep water by this species is reflected in the depth range distribution of the samples in the NEFC collection in that 45% of the samples and 48% of the specimens are in the 100-199 m depth range grouping; the 200-499 m grouping contains 33% of the samples and 40% of the specimens, while the 50-99 m grouping contains 19% for samples and 11% of the specimens; one sample (4%) and one specimen (0.6%) are in the 0-24 m grouping (Table 54).

The majority of our samples (40%) occurred in clay sediments; however, the greatest number of specimens (45%) occurred in till sediments which contained 16% of the samples, clay on the other hand contained 16% of the specimens; silty sand sediments contained 24% of the samples and 26% of the specimens. Other sediment types in which this species was found in our region were gravel, sand-gravel, sand-shell, sand, and silt substrates (Table 55). There are 2 samples containing 29 specimens which are unclassified with regard to sediment type.

***Portlandia minuscula* (Verrill and Bush 1897). Figure 95.**

Johnson (1934), Clarke (1962), and Abbott (1974) reported the distribution of this species to extend from off Massachusetts to Virginia.

The NEFC collection contains two specimens from one sample of this rather rare bivalve species (Table 5).

Our sample is from the Gulf of Maine proper adjacent to the northern edge of Georges Bank (Fig. 95; Theroux and Wigley footnote 4, table 167).

The above authors gave the depth distribution of this species as being 924 to 2,361 m.

Our sample is from a water depth of 192 m which places it in the 100-199 m depth range grouping.

The sample from which the specimens of this species were obtained was unclassified with regard to sediment type.

Subclass CRYPTODONTA
Order SOLEMYOIDA
Family SOLEMYACIDAE
Genus *Solemya* Lamarck 1818

***Solemya borealis* Totten 1834. Boreal awning clam. Figure 99.**

The boreal awning clam is normally found in the Canadian Maritime Provinces of Newfoundland, Labrador, and Nova Scotia and ranges south to the shores of Connecticut (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Although *Solemya borealis* is a moderately common to frequently occurring form within its range, the NEFC Specimen Reference Collection contains only one specimen from one sample (Table 5).

Our sample comes from the shore of Martha's Vineyard, Mass. (Fig. 99; Theroux and Wigley footnote 4, table 177).

Gosner (1971) reported this species from the Boreal province, while Dance (1974) claimed that is a Transatlantic inhabitant.

The normal depth range for this species occurs in shallow waters; however, it does range from 6 to 183 m in depth (Abbott 1968, 1974; Gosner 1971).

Our sample is from the shore at 0 m depth which places it in the 0-24 m depth range grouping.

We have not found any sediment preferences in the literature and unfortunately the collection data did not contain any sediment information for our sample.

***Solemya velum* Say 1822. Common Atlantic awning clam. Figure 100.**

The range of this species is from Nova Scotia and Newfoundland to Florida (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

Solemya velum is common to frequently occurring and is represented in our collection by 67 specimens from 33 samples (Table 5).

Our samples are from the Gulf of Maine, the periphery of Cape Cod, Mass., Georges Bank, and range on the outer continental shelf and slope, south to slightly north of Miami, Fla. (Fig. 100; Theroux and Wigley footnote 4, table 178).

This species is an inhabitant of the Boreal, Virginian, and Carolinian provinces (Coomans 1962); Gosner (1971) placed it in the Boreal and Virginian, and Dance (1974) stated that it is a Transatlantic inhabitant.

This species is normally found in intertidal areas and in shallow water bays but it does range out to 90 m (Abbott 1968, 1974; Porter 1974; Emerson et al. 1976).

The depth range of our samples is from 1 to 1,660 m with a mean of 105 m. The 0-24 m depth range grouping contains 42% of the samples and 65% of the specimens, while the 25-49 m grouping contains 15% of the samples and 8% of the specimens; the 50-99 m grouping contains 27% of the samples and 20% of the specimens, while the 100-199 m and the 200-499 m groupings each contain 6% of the samples and 3% of the specimens; the 1,000-1,999 m grouping contains 3% of the samples and 2% of the specimens (Table 56).

Morris (1951), Abbott (1974), and Emerson et al. (1976) all considered this species to inhabit mud and sand substrates.

Our samples also occupied medium to fine-grained substrates. Sand-shell substrates contained 10% of the samples and 5% of the specimens; sand substrates 57% of the samples and 35% of the specimens; silty sand sediments contained 14% of the former and 49% of the latter, while silt and clay substrates each contained 10% of the samples and 5% of the specimens (Table 57). There are 12 samples containing 28 specimens which are unclassified with regard to sediment type.

Subclass PTERIOMORPHIA
Order ARCOIDA
Family ARCIDAE

Our collection contains 7 samples yielding 15 specimens of members of the family Arcidae (Table 5).

The distribution of our samples is split into two groupings; one involves three samples in Chesapeake Bay, and the other, more loosely distributed off the middle and southern New England coast (Fig. 7; Theroux and Wigley footnote 4, table 11).

Members of this family are distributed in the Virginian, Carolinian, and Caribbean provinces in the western Atlantic and in the Celtic province in Europe (Coomans 1962).

Samples in our collection containing this taxon range from 13 to 3,820 m in depth, this range includes the deepest sampling site in our data base, the mean depth is 615 m. The 0-24 m depth range grouping contains 43% of the samples and 53% of the specimens; the 50-99, 100-199, 200-499, and 2,000-3,999 m depth range groupings each contain 14% of the remaining samples; specimen density in the above groupings is 13, 7, 7, and 20%, respectively (Table 58).

Fourteen percent of the samples containing Arcidae occurred in each of the following sediment types (percent specimens in parentheses): gravel (7), sand-gravel (7), till (7), silty sand (20), and clay (13). Sand contained 29% of the samples and 47% of the specimens (Table 59).

Genus *Anadara* Deshayes 1830.

Anadara ovalis (Bruguière 1789). Blood ark. Figure 4.

The blood ark is distributed from Massachusetts to the Gulf States; it also occurs in the West Indies and Brazil (Morris 1973; Abbott 1968, 1974; Emerson et al. 1976).

There are three samples containing three specimens of this species in our collection (Table 5). It is considered to be common to very abundant within its range (Abbott 1968, 1974; Dance 1974).

Our samples are from Woods Hole, Mass., on the southern Rhode Island shore, and east of Atlantic City, N.J. (Fig. 4; Theroux and Wigley footnote 4, table 6).

The main distribution is Transatlantic and Caribbean (Dance 1974).

The reported depth distribution for this species is from 0.3 to 31 m (Abbott 1968; Porter 1974).

Our samples range in depth from 0 to 24 m with a mean depth of 8 m.

Two samples containing *A. ovalis* were in a sand substratum, while the third was unclassified with regard to sediment type.

Anadara transversa (Say 1822). Transverse ark. Figure 4.

The transverse ark is reported to occur from Massachusetts to Florida, and is also found in Texas, the West Indies, and the Caribbean (Johnson 1934; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

There are 6 samples containing 17 specimens of this fairly common species in our collection (Table 5).

Our samples are from off the New England coast with one sample in the shoal region of Georges Bank and the remainder in Vineyard Sound and at the entrance to Long Island Sound (Fig. 4; Theroux and Wigley footnote 4, table 7).

The main distribution of this species is Virginian and Carolinian in the western Atlantic, and Celtic in Europe for the family (Coomans 1962); Gosner (1971) listed it as Virginian, and Dance (1974) as Transatlantic and Caribbean.

The bathymetric distribution of the transverse ark is from below low water to about 37 m. (Abbott 1968, 1974; Porter 1974).

The depth range of our samples is from 0 to 37 m with a mean of 12 m. The 0-25 m depth range grouping contains 83% of the samples and 94% of the specimens while the remaining 17 and 6%, respectively, are in the 25-49 m grouping.

Anadara transversa is found on rocks in sandy mud, and in sandy and mud bottoms (Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

One of our samples containing two specimens was obtained from a silty sand substratum; the remainder of our samples were unclassified with regard to sediment type.

Genus *Arca* Linné 1758

Arca sp. Figure 7.

There are 11 samples in our collection containing 19 specimens of the genus *Arca* (Table 5).

All of our samples occur between Cape Hatteras, N.C., and Miami, Fla. (Fig. 7; Theroux and Wigley footnote 4, table 10). Although the distribution chart shows only nine locations for this genus, one of the sampling sites yielded three replicate samples containing specimens.

This genus is Virginian, Carolinian, and Caribbean in distribution (Coomans 1962).

Our samples range from 6 to 852 m in depth with a mean of 192 m. The majority of samples (36%) and specimens (37%) are in the 25-49 m depth range grouping. The 0-24 and 500-999 m groupings contain 27 and 18% of the samples and 26 and 21% of the specimens, respectively; both the 50-99 and 200-499 m groupings contain 9% of the samples but 5 and 11% of the specimens, respectively (Table 60).

Members of the genus *Arca* were found in four sediment types: 45% of the samples and 47% of the specimens occurred in sand with lesser amounts occurring in sand-shell, silty sand, and silt substrates (Table 61).

Genus *Bathyarca* Kobelt 1891

Bathyarca anomala (Verrill and Bush 1898). Figure 18.

Both Johnson's (1934) and Abbott's (1974) information concerning this species is the reiteration of that provided by Verrill and Bush (1898) that it occurs off Cashes Ledge in the Gulf of Maine at 49 m depth.

There are 9 samples containing 129 specimens of this small bivalve in our collection (Table 5).

Our samples are all from the Gulf of Maine and at the mouth of the Bay of Fundy (Fig. 18; Theroux and Wigley footnote 4, table 29).

The samples in our collection range from 73 to 234 m in depth with a mean of 147 m. The majority of both samples and specimens, 44 and 58%, respectively, are in the 100-199 m depth range grouping; lesser amounts, 22% of samples and 39% of specimens, are in the 50-99 m grouping, and 33% of samples but only 3% of specimens are in the 200-499 m grouping (Table 62).

The majority of our samples and specimens were found in till substrates, 38 and 90%, respectively; 25% of the samples and 4% of specimens were in clay, while sand-gravel, sand, and silty sand sediments each contained 13% of the samples and from 4 to 2% of the specimens (Table 63). One sample containing 72 specimens is unclassified with regard to sediment type.

***Bathyarca pectunculoides* (Scacchi 1834). Scalloplike ark. Figure 19.**

Bathyarca pectunculoides occurs from the Gulf of St. Lawrence to off Cape Cod, Mass., and is also found in Greenland (Johnson 1934; La Rocque 1953; Morris 1973; Abbott 1974). Ockelmann (1958) showed a fairly widespread distribution in Arctic regions and the North Sea, while Clarke's (1962) data extended its distribution to include the Gulf of Mexico, North Eurasia, Western Europe, the Canaries, and the Mediterranean Sea.

There are 1,297 specimens from 157 samples of this species in our collection (Table 5).

Our samples, in the main, are from the Gulf of Maine and around Nova Scotia with a few occurring on the mid to upper continental slope from southern Georges Bank south to off Atlantic City, N.J. (Fig. 19; Theroux and Wigley footnote 4, table 30).

Gosner (1971) placed this species in the Boreal province.

The scalloplike ark is a deep water inhabitant, occupying a depth range of from 49 to 926 m (Johnson 1934); Clarke (1962) listed a depth range of 37 to 3,312 m.

Our samples range from 73 to 458 m in depth with a mean of 184 m. The majority of our samples (61%) and specimens (73%) are in the 100-199 m depth range grouping; the 200-499 m grouping contains 34% of the samples and 20% of the specimens, while the 50-99 m grouping contains only 5 and 7% of the samples and specimens, respectively (Table 64).

Sand and sand-shell were the only two sediment types which did not contain members of this species. The largest number of samples were in silty sand (36%), with till, gravel, and clay containing diminishing but significant amounts (20, 16, and 10%, respectively). Sand-gravel, sand, and silt sediments each contained < 8% of the samples. Gravel yielded the greatest amount of specimens (44%), followed by till (32%) and silty sand (14%). Sand-gravel, sand, silt, and clay each accounted for < 4% of the specimens (Table 65). There are 17 samples containing 202 specimens which are unclassified with regard to sediment type.

***Bathyarca* sp. Figure 20.**

The NEFC collection contains 14 specimens of *Bathyarca* sp. from 9 samples (Table 5).

Samples yielding specimens of *Bathyarca* sp. are from the Gulf of Maine (Fig. 20; Theroux and Wigley footnote 4, table 31).

The depth range of our samples is 128 to 242 m with a mean of 182 m. Two-thirds of the samples and 79% of the specimens are in the 100-199 m depth range grouping, and 33% of the samples with 21% of the specimens are in the 200-499 m grouping (Table 66).

No members of this taxon were found in gravel, sand-shell, or silt substrates. One-third of the samples containing 50% of the specimens occurred in clay sediments; 11 to 22% of the samples and 7 to 14% of the specimens occurred in other sediment types (Table 67).

Genus *Noetia* Grey 1840

***Noetia ponderosa* (Say 1822). Ponderous ark. Figure 70.**

The distribution of this species is from Cape Cod to Florida and Texas and it also occurs in the West Indies. It is uncommon in the northern reaches of the study area but very abundant south of Cape Hatteras, N.C. (Johnson 1934; Morris 1951, 1973; Abbott 1968, 1974; Emerson et al. 1976).

Noetia ponderosa is very common and abundant in southern regions; there are only five specimens of this species from one sample in our collection (Table 5).

Our sample is from inshore Connecticut waters (Fig. 70; Theroux and Wigley footnote 4, table 122).

The zoogeographic distribution of this species is in the Virginian and Carolinian provinces for American waters (Coomans 1962); Gosner (1971) placed it in the Virginian province, while Dance (1974) placed it in the Transatlantic and Caribbean provinces.

The ponderous ark is primarily a shallow water inhabitant but does range out to 37 m in depth (Abbott 1968, 1974; Porter 1974).

Our sample is from a water depth of 1 m. This depth places it in the 0-24 m depth range grouping.

Abbott (1958, 1974) and Morris (1973) reported the ponderous ark from sand bottoms. The NEFC sample is unclassified with regard to sediment type.

Family LIMOPSIDAE

There are 16 samples containing 1,052 specimens which are identified to the level of family Limopsidae in our collection (Table 5).

Samples containing members of this taxon are distributed from slightly south and offshore of Delaware Bay and at the entrance to Chesapeake Bay and range, with a gap at Cape Hatteras, N.C., to Key West, Fla. (Fig. 52; Theroux and Wigley footnote 4, table 85).

Our samples of this taxon range in depth from 13 to 60 m with a mean of 259 m. Fifty percent of the samples and 3% of the specimens are in the 100-199 m depth range grouping while 25% of the samples but 97% of the specimens are in the 200-499 m grouping; the 500-999 m grouping contains 13% of the samples but only 0.3% of the specimens; the 0-24 m grouping and the 50-99 m grouping each contain 6% of the samples but 0.2 and 0.1% of the specimens, respectively (Table 68).

The majority of samples and specimens were obtained in sand which contained 50% of the samples and 99% of the specimens; gravel contained 6% of the samples and 0.2% of the specimens, sand-shell 19% of the samples and 0.5% of the specimens, while silty sand and silt each contained 13% of the samples and 0.3 and 0.2% of the specimens, respectively (Table 69).

Genus *Limopsis* Sassi 1827

***Limopsis affinis* Verrill 1885. Gregarious limopsis. Figure 52.**

Both Johnson (1934) and Abbott (1974) reported this species as occurring south of Martha's Vineyard, Mass., whereas, Morris (1973) reported it as occurring from Massachusetts to Florida.

There are 10 specimens from 4 samples of this rather rare species in the NEFC collection (Table 5).

Our samples are from the upper continental slope between Delaware Bay and Cape Hatteras, N.C. (Fig. 52; Theroux and Wigley footnote 4, table 86).

Johnson (1934) and Abbott (1974) reported a depth occurrence of 361 m for this species.

Our samples are from between 1,100 and 1,800 m in depth with a mean of 1,540 m. This depth range places all samples and specimens in the 1,000-1,999 m depth range grouping (Table 70).

Our samples occurred in three sediment types: silty sand, silt, and clay. Fifty percent of the samples and 20% of the specimens occurred in silt while each of the remaining two types, silty sand and clay, contained 25% of the samples and 40% of the specimens (Table 71).

***Limopsis cristata* Jeffreys 1876. Cristate limopsis. Figure 52.**

The distribution of this species is from Cape Cod, Mass., to southeast Florida (Johnson 1934; Abbott 1974). It is also found in the Caribbean and western Europe (Clarke 1962).

This species which is commonly dredged off Florida, is represented by four specimens from three samples in our collection (Table 5).

Our samples are from continental slope waters south of Georges Bank with one inshore sample north of Jacksonville, Fla. (Fig. 52; Theroux and Wigley footnote 4, table 87).

Johnson (1934) reported a depth distribution of 156 to 2,004 m, while Clarke (1962) reported a depth range of 117 to 5,014 m.

Our samples are from water depths ranging from 8 to 1,625 m with a mean of 699 m. Thirty-three percent of the samples and 25% of the specimens are in the 0-24 m and 200-499 m depth range groupings; whereas, 33% of the samples and 50% of the specimens are in the 1,000-1,999 m grouping (Table 72).

Two of our samples occurred in silty sand accounting for 67% of the samples and 50% of the specimens, and one sample or 33% of the samples occurred in silt which contained 50% of the specimens (Table 73).

***Limopsis minuta* Philippi 1836. Minute limopsis. Figure 53.**

The distribution of this species ranges from Newfoundland to both sides of Florida (Johnson 1934; La Rocque 1953; Morris 1973; Abbott 1974). Ockelmann (1958) and Clarke (1962) reported on the distribution of this species for Arctic and European regions where it is fairly widespread, including the Canary Islands and the Mediterranean.

Limopsis minuta is represented by 30 specimens from 13 samples in the NEFC collection (Table 5).

Of the 13 samples in the NEFC collection, 1 is in the Gulf of Maine, the remainder are on the upper continental slope between Browns Bank and Chesapeake Bay (Fig. 53; Theroux and Wigley footnote 4, table 88).

The minute limopsis is a deep water species which ranges between 55 and 5,014 m depth (Clark 1962).

Our samples range from 16 to 1,660 m in depth with a mean of 1,038 m. Sixty-two percent of the samples and 60% of the specimens are in the 1,000-1,999 m depth range grouping; 23% of the samples and 33% of the specimens are in the 500-999 m grouping and both the 200-499 m and 0-24 m groupings contain 8% of the samples and 3% of the specimens (Table 74).

Two sediment types, silty sand and silt, each yielded 31% of the samples but 23 and 17% of the specimens, respectively; however, clay accounted for 23% of the samples and 37% of the specimens; it was found in one other sediment type within our study area, sand-gravel, which contained 8% of the samples and 3% of the specimens (Table 75).

***Limopsis sulcata* Verrill and Bush 1898. Sulcate limopsis. Figure 53.**

This species is reported to occur from Cape Cod, Mass., to Florida; it ranges into the Gulf States and the West Indies (Johnson 1934; Morris 1973; Abbott 1974).

The NEFC collection contains 21 specimens from 6 samples of this common species (Table 5).

Our samples are located at the continental shelf break and on the upper continental slope between Nova Scotia and Hudson Canyon (Fig. 53; Theroux and Wigley footnote 4, table 89).

The sulcate limopsis is a moderately shallow to deep water inhabitant occupying depths between 80 and 639 m (Abbott 1974; Porter 1974).

Our samples are from water depths ranging between 93 and 1,934 m with a mean of 1,406 m. The 50-99 m depth range grouping contains 17% of the samples and 48% of the specimens, while the 1,000-1,999 m grouping contains 83% of the samples and 52% of the specimens (Table 76).

Our samples were obtained from three sediment types: silty sand, silt, and clay, each of which contained 33% of the samples but 14, 33, and 52% of the specimens, respectively (Table 77).

***Limopsis* sp. Figure 53.**

The NEFC collection contains two specimens from two samples of this genus (Table 5).

Our samples are located on the upper portion of the continental slope south of Cape Cod, Mass. (Fig. 53; Theroux and Wigley footnote 4, table 90).

The samples are from 400 and 1,550 m water depth. Fifty percent of both samples and specimens are in the 200-499 m depth range grouping; the remaining 50% of the samples and specimens are in the 1,000-1,999 m grouping (Table 78).

Our samples were obtained from silty sand and silt sediments, each of which contained one sample and one specimen (Table 79).

Family GLYCYMERIDIDAE
Genus *Glycymeris* Costa 1778

***Glycymeris americana* (DeFrance 1829). Giant American bittersweet. Figure 46.**

This species occurs from North Carolina to Florida; it also occurs in the West Indies, Texas, and Brazil (Johnson 1934; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976). Although Morris' (1973) work includes the distribution of the other authors, he extended it northward to include Virginia.

Glycymeris americana is a relatively rare bivalve represented in our collection by one specimen from one sample (Table 5).

The NEFC sample is from the continental shelf east of Jacksonville, Fla. (Fig. 46; Theroux and Wigley footnote 4, table 76).

This species is found in moderately shallow water ranging from 2 to 119 m in depth (Johnson 1934; Abbot 1974). Our sample is from 24 m, placing it in the 0-24 m depth range grouping.

The substrate type for our sample is sand.

***Glycymeris pectinata* (Gmelin 1791). Comb bittersweet. Figure 47.**

The known distribution of this species is from the Carolinas to Florida, the West Indies, onward to Texas and Mexico, and south to Brazil (Johnson 1934; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

The comb bittersweet is a common to moderately common bivalve species of the U.S. east coast; the NEFC collection contains 40 specimens from 20 samples (Table 5).

Our samples are from the continental shelf ranging from Cape Fear, N.C., south to the southern tip of Florida with a moderate gap in the latitude of Charleston, S.C. (Fig. 47; Theroux and Wigley footnote 4, table 77).

Dance (1974) placed this species in the Caribbean zoogeographic province.

The bathymetric range of this species is from shallow to moderately deep water which ranges from 4 to 320 m (Johnson 1934).

Our samples range from 12 to 112 m in depth with a mean of 40 m. The majority of samples (55%) and specimens (38%) are in the 25-49 m depth range grouping with 30% of the samples and 30% of the specimens in the 0-24 depth range grouping; 15% of the samples, and 33% of the specimens are in the 100-199 m depth range grouping (Table 80).

This species is found on sand and gravel bottom (Abbott 1968; Morris 1973; Emerson et al. 1976).

Our samples occurred in sand-gravel, sand-shell, sand, and silty sand substrates. There were more samples (50%) in sand than specimens (30%); however, sand-shell substrates contained 40% of the samples and 55% of the specimens; sand-gravel and silty sand each contained 5% of the samples but 10 and 5%, respectively, for specimens (Table 81).

***Glycymeris* sp. Figure 48.**

The NEFC collection contains 48 specimens of bivalves from 23 samples which have been classified to the generic level *Glycymeris* sp. (Table 5).

Samples of this taxon are from the continental shelf and slope between Cape Fear, N.C., and Key West, Fla. (Fig. 48; Theroux and Wigley footnote 4, table 78).

Our samples range in depth from 10 to 580 m of water with a mean of 133 m. Thirty-nine percent of the samples and 42% of the specimens are in the 25-49 m depth range grouping; 30% of the samples and 23% of the specimens are in the 200-499 m grouping; 22% of the samples and 29% of the specimens are in the 0-24 m depth range grouping; the 100-199 m and the 500-999 m groupings each contain 4% of the samples and 2 and 4% of the specimens, respectively (Table 82).

Our samples occurred in three sediment types, shell, sand-shell, and sand. Sand was the predominant substrate, containing 74 and 83% of samples and specimens, respectively; sand-shell contained 22% of samples and 15% of the specimens, while shell contained 4 and 2%, respectively (Table 83).

Order MYTILOIDA
Family MYTILIDAE

The NEFC Specimen Reference Collection contains 201 specimens of members of the family Mytilidae which were obtained from 33 samples (Table 5).

Samples containing members of the mussel family range from offshore Nova Scotia south through the Gulf of Maine onto the Southern New England continental shelf and slope off Atlantic City, N.J., and Delaware Bay (Fig. 69; Theroux and Wigley footnote 4, table 119).

The range in depth for these samples is 15 to 564 m with a mean of 139 m. The majority of both samples and specimens are in the 100-199 m depth range grouping which contains 36 and 49%, respectively; the 50-99 m grouping contains 21% of the samples and 18% of the specimens, while the 200-499 m grouping contains 24% of the samples and 8% of the specimens; the 25-49 m grouping contains 6% of the samples and 21% of the specimens; the 0-24 m and 500-599 m groupings contain 9 and 3%, respectively, for samples and 2% each of specimens (Table 84).

Members of this taxon were obtained from all sediment types considered in this report except shell. Abundance in terms of decreasing sediment particle size was 8% of the samples and 20% of the specimens in gravel; 12 and 42%, respectively, in sand-gravel; 8 and 2%, respectively, in till; 4 and 14%, respectively, in sand-shell; 19 and 3%, respectively, in sand; 8 and 8%, respectively, in silty sand; 15% of the samples and 6% of the specimens occurred in silt, and 27 and 5%, respectively, occurred in clay (Table 85). There are 7 samples containing 30 specimens which are unclassified with regard to sediment type.

Genus *Brachidontes* Swainson 1840

***Brachidontes exustus* (Linné 1758). Scorched mussel. Figure 21.**

This mussel is distributed from Cape Hatteras, N.C., to Texas and the West Indies, and Brazil to Uruguay, and is often locally abundant (Morris 1973; Abbott 1974).

Our collection contains 12 specimens from 2 samples of this species (Table 5). Abbott (1974) noted that this species prefers brackish waters.

One of our samples is from north of Charleston, S.C., and the other north of Jacksonville, Fla. (Fig. 21; Theroux and Wigley footnote 4, table 33).

This species, which is normally found on rocks and pilings and commonly found washed ashore on shells and seaweed (Abbott 1974), also occurs in moderately shallow water (Morris 1973). Our samples are from 5 and 6 m of water.

One sample containing six specimens was obtained from a sand substratum while the second, also with six specimens, was from a silty sand sediment.

Genus *Crenella* Brown 1827

***Crenella decussata* (Montagu 1808). Decussate crenella. Figure 31.**

This species is thought to be continuously circumpolar and

occurs in both the North Atlantic and North Pacific Oceans. The Atlantic distribution extends from Greenland to North Carolina in the region of Cape Hatteras. It is also reported from the Gulf of Mexico and the Caribbean. In the Pacific it is distributed from the low Arctic regions to California and Korea. It also occurs off the northern Eurasian continent, in western Europe, Norway, and is considerably distributed throughout the Arctic, south to the British Isles (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Tebble 1966; Morris 1973; Abbott 1974).

Crenella decussata is represented in the NEFC collection by 443 specimens from 83 samples (Table 5).

Our samples are from the fishing banks east of Nova Scotia, the Scotian Shelf, the Gulf of Maine basin, on the periphery of Georges Bank, and on the outer continental shelf in the Middle Atlantic Bight region south to Cape Hatteras, N.C.; one sample occurs south of Cape Fear on the mid-continental shelf (Fig. 31; Theroux and Wigley footnote 4, table 50).

The zoogeographic provinces occupied by this species are the Arctic, the Boreal, the Virginian, and Celtic in Europe (Coomans 1962), while Ockelmann (1958) listed it as low Arctic-boreal and circumpolar.

This small bivalve has a considerable bathymetric range occurring from just offshore out to considerable depths, a depth range extending from 4 to 3,203 m (Clarke 1962); however, Ockelmann (1958) reported that in northern seas this species is mainly littoral.

The depth range of our samples is from 23 to 201 m with a mean of 83 m. The distribution of our samples with regard to depth range groupings is as follows: 62% of the samples and 68% of the specimens are in the 50-99 m depth range grouping; 21% of the samples and 13% of the specimens are in the 100-199 m depth grouping, while 12% of the samples but 18% of the specimens are in the 25-49 m grouping; the 0-24 m grouping contains 4% of the samples and only 1% of the specimens, while the 200-499 m grouping contains 2% of the samples and 0.5% of the specimens (Table 86).

This species occurs in sand and clay and on sand or gravel bottoms (Tebble 1966); Morris (1973) considered it to inhabit mud bottoms.

Our samples occurred in all but one of the nine sediment types we are using for purposes of this report, none were found in sand-shell. Sand, silty-sand, and clay substrates were preferred, 35% of the samples and 25% of the specimens occurred in sand; silty sand contained 30% of the samples and 56% of the specimens, while clay substrates contained 17% of the samples and 9% of the specimens. Significantly smaller amounts occurred in the remaining sediment types, gravel, sand-gravel, till, shell, and silt (Table 87). Two samples containing four specimens are unclassified with regard to sediment type.

Crenella glandula (Totten 1834). Glandula crenella. Figure 32.

This very common mussel is distributed from Labrador to North Carolina (Johnson 1934; La Rocque 1953; Ockelmann 1958; Morris 1973; Abbott 1974).

This small mussel is represented in the NEFC collection by 229 samples (2.2% of samples) containing 1,135 specimens (1.7% of specimens) (Table 5).

Our samples are widely distributed on the continental shelf and upper slope; they range from both sides of Nova Scotia, throughout the Gulf of Maine, onto Georges Bank, and the Southern New England shelf and slope, into the Middle Atlantic Bight region, south to the mouth of Chesapeake Bay (Fig. 32; Theroux and Wigley footnote 4, table 51).

This species occupies the Boreal and Virginian zoogeographic provinces (Coomans 1962).

The bathymetric range of this species is from 6 to 110 m (Johnson 1934).

The depth range of our samples is from 0 to 406 m with a mean of 99 m. Distribution of samples and specimens with regard to depth range groupings is 4% of the samples and 6% of the specimens are in the 0-24 m grouping, while 9% of the samples but 46% of the specimens are in the 25-49 m depth range grouping; the largest number of samples (55%) are in the 50-99 m depth range grouping, but it contains only 31% of the specimens; 30% of the samples and 16% of the specimens are in the 100-199 m grouping and 4% of the samples and 1% of the specimens are in the 200-499 m grouping (Table 88).

Crenella glandula occurred in all of our sediment types. There appears to be a preference for till, sand, silty-sand, and clay sediments both in terms of numbers of samples found in these sediment types as well as the number of specimens; significantly smaller amounts are found in gravel, sand-gravel, shell, sand-shell, and silt substrate types. Table 89 lists the pertinent data for this species in relation to bottom sediments. Twenty-four samples containing 139 specimens are unclassified with regard to sediment type.

Crenella sp. Figure 33.

The NEFC collection contains 35 samples with 69 specimens identified to the generic level of *Crenella* sp. (Table 5).

Samples in our collection containing members of this genus are from the Gulf of Maine, Georges Bank, the Middle Atlantic Bight, off the coast of South Carolina, and the mid-section of Florida off Jacksonville (Fig. 33; Theroux and Wigley footnote 4, table 52).

Members of this genus are found in the Arctic, Boreal, and Virginian provinces in the northwest Atlantic, and in the Celtic province in Europe (Coomans 1962).

The depth range of our samples is 15 to 2,412 m with a mean of 209 m. The majority of samples are in the 100-199 m depth range grouping which contains 37% of the samples and 57% of the specimens. The 50-99 m grouping contains 29% of the samples and 19% of the specimens; the 0-24 and 25-49 m groupings each contain 14% of the samples but 7 and 13% of the specimens, respectively; 3% of the samles are in the two deepest range groupings, 1,000-1,999 and 2,000-3,999 m which account for 3 and 1% of the specimens, respectively (Table 90).

Samples containing *Crenella* sp. occurred in all but one sediment type, till. Sand yielded the largest amount of samples (34%) followed by silty sand (22%) and gravel (13%); the other sediment types had amounts ranging between 3 and 9%. Sand-gravel yielded the greatest amount of specimens (29%) closely followed by sand (27%); much smaller amounts (3 to 11%) occurred in other sediment types (Table 91). There are three samples containing six specimens which are unclassified with regard to sediment type.

Genus *Dacrydium* Torell 1859

***Dacrydium vitreum* (Hölboll in Möller 1842). Glassy teardrop. Figure 41.**

This species is somewhat shrouded in controversy reflected in the variability of its distribution as claimed by different authors. Ockelmann (1958) voiced his concern in believing that this species "has a panarctic distribution, but is absent from truly boreal regions." He postulates that there are "4 different forms from the N. Atlantic, most probably distinct species." We, however, have found no clear differentiation among the various sources examined and, therefore, are maintaining, at this time, the integrity of this species as it presently exists. Our distributional records, however, contain an intriguing inshore-offshore disparity which should be investigated further (see below).

Johnson (1934) and La Rocque (1953) reported the glassy teardrop as occurring from the Arctic Ocean to Florida; Morris (1951) included the preceding range and added that it also occurs in the English Channel, at the Azores, and in the Mediterranean. Ockelmann (1958), who reported it widely distributed throughout Arctic regions, stated that it also probably occurs in the Gulf of St. Lawrence and in Nova Scotia, and extends from Newfoundland to Cape Cod. Clarke (1962), in addition to Arctic and subarctic distributional data, reported it occurs in Norway, Northern Eurasia, West Europe, the Canaries, and on the Middle Atlantic Ridge in the region of the Azores. Abbott's (1974) distributional range is from Greenland to the Gulf of Mexico, he also included Norway.

Dacrydium vitreum is common; our collection contains 522 specimens from 95 samples (Table 5).

The NEFC sampling data shows two separate groupings of samples, one of which occurs in the Gulf of Maine Basin area, including the Scotian Shelf and Browns Bank, ranging onto the southwestern part of Georges Bank; the second grouping occurs in deep offshore waters beyond the shelf break on the continental slope, ranging from the Northeast Peak of Georges Bank to slightly south of Delaware Bay with one other sample occurring south of Cape Hatteras at the shelf break (Fig. 41; Theroux and Wigley footnote 4, table 67). This distributional disparity bears further investigation as this pattern may indicate the existence of two separate populations or, indeed, separate species occupying different bathymetric ranges and habitats.

In addition to Ockelmann's (1958) reporting of this species as panarctic in the North Atlantic only, Gosner (1971) reported it occupying the Boreal and Virginian zoogeographic provinces as well.

The glassy teardrop enjoys a wide bathymetric range occupying water depths from 6 to 4,454 m (Ockelmann 1958; Clarke 1962).

Our samples are also widely distributed by depth, ranging from 38 to 3,055 m with a mean depth of 305 m. The majority of samples and specimens are in the 100-199 m grouping, which contains 52% of the samples and 71% of the specimens, and the 200-499 m grouping containing 38% of the former and 26% of the latter. Significantly smaller amounts occur in the other depth range groupings: the 25-49, 500-999, 1,000-1,999 and the 2,000-3,999 m groupings (Table 92). There is no depth information concerning one sample which contains three specimens.

No samples obtained from till, shell, or sand-shell sediments contained specimens of the glassy teardrop. The majority of both samples and specimens occurred in clay where 54% of the former and 74% of the latter were obtained. The next most plentiful amounts of samples and specimens occurred in silty sand where 19 and 14%, respectively, occurred. Smaller amounts occurred in gravel, sand-gravel, sand, and silt substrates (Table 93). There are 3 samples containing 11 specimens which are unclassified with regard to sediment type.

Genus *Geukensia* Poel 1959

***Geukensia demissa* (Dillwyn 1817). Atlantic ribbed mussel. Figure 46.**

This is a common and locally abundant species which has been introduced into California at San Francisco Bay (Abbott 1974).

The range of this species extends from the Gulf of St. Lawrence to South America as well as having been introduced in California (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

The NEFC collection contains 38 specimens from 11 samples (Table 5).

Our samples are from the shores of Cape Cod, Mass., with one sampling site on the Connecticut shore (Fig. 46; Theroux and Wigley footnote 4, table 75).

This species occurs in the Boreal, Virginian, and Carolinian provinces (Coomans 1962); Gosner (1971) listed it as occupying the Boreal and Virginian provinces, while Dance (1974) placed it in the Boreal, Transatlantic, and Californian provinces.

This species is found in the intertidal region from low tide to approximately 6 m (Abbott 1968, 1974; Porter 1974).

All of our samples, with the exception of one containing two specimens which had no depth information, were collected at a depth of 1 m which places them in the 0-24 m depth range grouping (Table 94).

This species is an inhabitant of salt marshes, mud-sand flats, and also occurs on muddy or peaty bottoms (Morris 1951, 1973; Abbott 1968, 1974; Emerson et al. 1976).

Seventy-five percent of our samples and 94% of our specimens occurred in silty sand substrates with 25% of the samples and 6% of the specimens occurring in sand (Table 95). There are 7 samples containing 20 specimens which are unclassified with regard to sediment type.

Genus *Modiolus* Lamarck 1799

***Modiolus modiolus* (Linné 1758). Northern horse mussel. Figure 62.**

The northern horse mussel is widely distributed throughout northern seas ranging in the Atlantic from Arctic seas to Cape Hatteras, N.C., and in the Pacific from Arctic seas south to San Pedro, Calif.; it is also widely distributed throughout Arctic regions and in northern Europe (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974).

Modiolus modiolus is the largest and commonest mussel of New England (Abbott 1968); it is represented in the NEFC

collection by 1,132 specimens from 127 samples each of which represent approximately 1% of their respective group (Table 5).

Our samples are from the periphery of the Gulf of Maine and Georges Bank, and extend onto the Southern New England shelf and slope region with two isolated samples on the continental shelf off New York and Atlantic City, N.J. (Fig. 62; Theroux and Wigley footnote 4, table 108).

This species occupies the Arctic, Boreal, Virginian, and Carolinian zoogeographic provinces in the western Atlantic, and the Celtic province in Europe (Coomans 1962); Gosner (1971) listed it as occurring in the Boreal and Virginian provinces, and Dance (1974) placed it in the Boreal, Transatlantic, Aleutian, and Japonic provinces.

This species ranges from slightly below low tide level out to approximately 81 m depth (Gosner 1971; Porter 1974).

The samples in the NEFC collection range in depth between 13 and 256 m with a mean of 77 m. The majority of our samples are in the 50-99 m depth range grouping which contains 55% of the samples and 27% of the specimens; the largest number of specimens (58%), however, are in the 25-49 m grouping which contains 23% of the samples. Seventeen percent of the samples and 10% of the specimens, are in the 100-199 m depth range grouping, while the 200-499 m grouping contains 2% of the samples and 5% of the specimens; the smallest amount of each is in the 0-24 m depth range grouping which contains 2% of the samples and 0.3% of the specimens (Table 96).

Morris (1951) reported this species as an inhabitant of rocky bottoms.

Our samples occupied all sediment types considered in this report. The majority of samples occurred in sand which contained 34% of the former and 10% of the specimens. The largest number of specimens (54%) were in sand-shell bottoms which contained only 6% of the samples; sand-gravel substrates contained 24% of each, samples and specimens; significantly smaller amounts occurred in gravel, till, shell, sand-shell, silty sand, silt, and clay sediments (Table 97). There are 29 samples containing 179 specimens which are unclassified with regard to sediment type.

Genus *Musculus* Bolten 1798

Musculus corrugatus (Stimpson 1851). Wrinkled musculus. Figure 64.

The wrinkled musculus occurs in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Arctic seas and northern Europe to off North Carolina and is considered to be circumpolar, while in the Pacific it ranges from Alaska to Puget Sound (Johnson 1934; Ockelmann 1958; Abbott 1974).

This small mussel is represented in the NEFC collection by 88 specimens from 11 samples (Table 5).

Our samples are confined to the Georges Bank-Gulf of Maine and Nantucket Shoals regions (Fig. 64; Theroux and Wigley footnote 4, table 112).

It is an inhabitant of the Arctic, Boreal, and Virginian provinces (Coomans 1962); however, Gosner (1971) placed it in the Boreal and Virginian provinces.

The range of depth in which this species is found is from 2 to 183 m (Johnson 1934; Abbott 1974).

The NEFC samples are from water depths ranging between 35 and 102 m with a mean of 77 m. The majority of samples (73%) and specimens (75%) are in the 50-99 m depth range grouping; 18% of the samples and 2% of the specimens are in the 25-49 m grouping, and 9% of the samples, but 23% of the specimens are in the 100-199 m depth range grouping (Table 98).

The majority of both samples and specimens occurred in sand-gravel substrates where 40% of the samples and 61% of the specimens were found; till substrates contained 30% of the samples and 33% of the specimens, while shell contained 10% of the samples and 4% of the specimens: sand substrates yielded 20% of the samples and 2% of the specimens (Table 99). There is one sample containing one specimen which is unclassified with regard to sediment type.

Musculus discors (Linné 1767). Discord musculus. Figure 65.

This mussel occurs in both the Atlantic and Pacific Oceans. In the Atlantic it ranges from Labrador and Arctic seas to Long Island and is considered to be circumpolar; in the Pacific it ranges from Arctic seas to Puget Sound and to Japan; it is also found in western Europe, in the Mediterranean, and in northern Eurasia (Johnson 1934; Ockelmann 1958; Clarke 1962; Tebble 1966; Morris 1973; Abbott 1974).

This is a commonly dredged deep water mussel which is represented in our collection by 457 specimens from 80 samples (Table 5).

Our samples are from the periphery of the Gulf of Maine and the Northeast Peak and Southwestern Part of Georges Bank (Fig. 65; Theroux and Wigley footnote 4, table 113).

This species is Arctic, Boreal, Virginian, and Celtic in zoogeographic distribution (Coomans 1962); Gosner (1971) placed it in the Virginian province; Dance (1974) placed it in the Boreal, Mediterranean, Transatlantic, Arctic, Indo-Pacific, and Japonic provinces.

The depth range for this species is from 0 to 3,267 m (Clarke 1962).

Our samples are from depths which range between 29 and 198 m with a mean of 81 m. Fifty-nine percent of the samples and 40% of the specimens are in the 50-99 m depth range grouping; 18% of the samples and 54% of the specimens are in the 25-49 m grouping, and 24% of the samples and 6% of the specimens are in the 100-199 m grouping (Table 100).

The only sediment type in which this species was not found was silt. The majority of both samples and specimens 42 and 82%, respectively, occurred in sand-gravel; gravel substrates contained 21% of the samples and 5% of the specimens; till substrates contained 16% of the samples and 4% of the specimens; shell contained 2% of the samples and 4% of the specimens; sand-shell contained 4% of the samples, and $< 1\%$ of the specimens; sand contained 9% of the samples, 2% of the specimens; while silty sand had 2% and $< 1\%$, respectively; clay 5% of the samples and 1% of the specimens (Table 101). There are 23 samples containing 40 specimens which are not classified with regard to sediment type.

Musculus niger (Gray 1824). Black musculus. Figure 66.

The black musculus is found in both the North Atlantic and North Pacific Ocean. In the Atlantic it ranges from Arctic seas and Greenland to North Carolina, and in the Pacific from

Alaska to Puget Sound; it is also present in northern Europe and in the Sea of Okhotsk and enjoys a widespread distribution throughout the Arctic, it is considered to be a circumpolar species (Johnson 1934; Morris 1951, 1973; Ockelmann 1958; Tebble 1966; Abbott 1974; Emerson et al. 1976).

Musculus niger is a common musculus represented in our collection by 406 specimens from 115 samples (Table 5).

The samples in the NEFC collection occur from Nova Scotia to slightly south of Delaware Bay, on the continental shelf, and around the periphery of the Gulf of Maine and on Georges Bank (Fig. 66, Theroux and Wigley footnote 4, table 114).

The main distribution for this species is panarctic and Boreal (Ockelmann 1958); Coomans (1962) placed it in the Arctic, Boreal, Virginian, and Celtic provinces; Gosner's (1971) view was that it is Boreal and Virginian, while Dance (1974) placed it in the Arctic, the Boreal, Transatlantic, and Aleutian zoogeographic provinces.

The bathymetric range of this species extends from 2 to 110 m (Gosner 1971; Abbott 1974).

Our suite of samples ranges in depth between 15 and 264 m with a mean of 76 m. The majority of the samples (55%) and specimens (58%) are in the 50-99 m depth range grouping; the 100-199 m grouping contains 22% of the samples and 16% of the specimens; the 25-49 m grouping, 20% of the samples and 24% of the specimens; 3% of the samples and 1% of the specimens are in the 0-24 m depth range grouping and < 1% of both samples and specimens in the 200-499 m grouping (Table 102).

This species can be found in rock crevices and it is also found attached to empty shells (Morris 1973).

Our samples occupied all the sediment types considered in this report. The preferred sediment type, at least with regard to amounts of samples and specimens, was sand which contained 40% of the samples and 25% of the specimens; sand-gravel substrates were next with 15% of the samples and 20% of the specimens while till contained 7% of the samples but 25% of the specimens. Smaller amounts were recorded from gravel, shell, sand-shell, silty sand, silt, and clay substrates (Table 103). There are 10 samples containing 34 specimens which are unclassified with regard to sediment type.

***Musculus* sp. Figure 67.**

The NEFC specimen reference collection contains 13 samples which yielded 75 specimens of this genus (Table 5).

Samples containing specimens of *Musculus* are from the Gulf of Maine and the northern edge of Georges Bank (Fig. 67; Theroux and Wigley footnote 4, table 115).

The depth range of the NEFC samples is from 35 to 256 m with a mean of 115 m. The majority of the samples (54%) are in the 50-99 m grouping, but the majority of specimens (57%) are in the 100-199 m grouping, the former contained 23% of the specimens and the latter 15% of the samples; 23% of the samples and 9% of the specimens are in the 200-499 m grouping and 8% of the samples and 11% of the specimens in the 25-49 m depth range grouping (Table 104).

There was not a great deal of variability in the abundance of samples occurring in the various sediment types in which they were found, but more discrepancy in the amounts of specimens obtained from each sediment type. Sand-gravel contained 30% of the samples, while gravel and clay each contained 20% of the samples; till, sand, and silty sand each contained 10% of the samples. In terms of numbers of organisms the majority of specimens (61%) were obtained from gravel substrates; there was 27% in sand-gravel substrates, 5.6% in clay, 4% in till, and 1.4% each in sand and silty sand (Table 105). There are three samples containing four specimens which are unclassified with regard to sediment type.

Genus *Mytilus* Linné 1758

***Mytilus edulis* Linné 1758. Blue mussel. Figure 70.**

The blue mussel enjoys a widespread distribution throughout northern oceans occurring in both the North Atlantic and North Pacific Oceans. In the Atlantic it occurs from the Arctic Ocean to South Carolina while in the Pacific it ranges from Alaska to California and is also found in Japan; in Europe it ranges along the European coast into the Mediterranean and Baltic Seas (Johnson 1934; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976). Porter (1974) stated that below Cape Hatteras, N.C., specimens are usually small or young.

Mytilus edulis, which is very common in New England and common elsewhere throughout its range, is well represented in the NEFC collection which contains 5,272 specimens which make up 5% of the total number of specimens from 107 samples or 1% of the total number of samples (Table 5).

Our samples range from the Scotian Shelf into the Gulf of Maine, on Georges Bank, in the Cape Cod region, south to inshore waters off New York City; they occur in the mouth of Delaware Bay, in Chesapeake Bay, and Pamlico Sound; there is one offshore sample off Charleston, S.C. (Fig. 70; Theroux and Wigley footnote 4, table 120).

The main distribution, according to Ockelmann (1958), is low Arctic-boreal and discontinuously circumpolar; it is also Mediterranean-Atlantic. Coomans (1962) placed it in the Arctic-boreal, Virginian, and Celtic provinces, while Gosner (1971) placed it in the Boreal and Virginian provinces; Dance (1974) considered it to occupy the Boreal, Mediterranean, Atlantic, Aleutian, Caribbean, and Transatlantic provinces and mentioned that it was introduced into the Japonic and the Indo-Pacific provinces.

Ockelmann (1958) listed the depth range for this species as occurring between the tidal zone to 180 m at Jan Mayen and mentioned that it is only occasionally found at depths below 50 m; Gosner (1971) and Morris (1973) reported it from the littoral region intertidally to shallow water.

The NEFC samples range in depth from 0 to 232 m with a mean of 52 m. In order of decreasing depth range, 34% of the samples and 15% of the specimens are in the 0-24 m grouping, 22% of the samples and 73% of the specimens in the 25-49 m grouping, 33% of the samples and 12% of the specimens in the 50-99 m grouping with a sharp dropoff in abundance occurring at the 100-199 m grouping which contains 9% of the samples and 0.5% of the specimens, while 3% of the samples and 0.1% of the specimens are in the 200-499 m grouping (Table 106). There is one sample which contains three specimens which has no associated depth information.

The only sediment type, of the nine considered in this report, which did not contain specimens of *Mytilus edulis* was sand-shell. Abundance in terms of decreasing particle size was as follows: 7% of the samples and 3% of the specimens

occurred in gravel; 16 and 44%, respectively, in sand-gravel; 3 and 1%, respectively, in till; 2 and 0.3%, respectively, in shell, with an increase in sand to 44% for samples and 13% for specimens; silty sand contained 23% of the samples and 38% of the specimens, silt 2% for samples and 0.1% of the specimens, while clay contained 5% of the samples and 1% of the specimens (Table 107). There are 45 samples containing 4,189 specimens which are unclassified with regard to sediment type.

Order PTERIOIDA
Family PECTINIDAE

The NEFC collection contains 14 samples yielding 23 specimens which are classified to the family level Pectinidae (Table 5).

Samples containing members of this taxon are distributed throughout the study area in isolated patches from Nova Scotia south to north of Miami, Fla. (Fig. 84; Theroux and Wigley footnote 4, table 145).

Members of the family Pectinidae in the NEFC collection range in depth between 23 and 310 m with a mean of 104 m. Table 108 lists the occurrence of members of the Pectinidae in relation to range in water depth.

Sediment types in which members of this family were found included gravel, shell, sand-shell, sand, silty sand, and silt. Table 109 lists the occurrence of Pectinidae in our collection in relation to bottom sediments. There are two samples containing two specimens which are unclassified with regard to sediment type.

Genus *Aequipecten* Fischer 1886

***Aequipecten phrygium* (Dall 1886). Spathate scallop. Figure 3.**

This scallop is distributed from Cape Cod, Mass., to Florida and the West Indies (Johnson 1934; Abbott 1974; Porter 1974). Abbott (1974) considered it uncommon off Miami and the lower Florida Keys.

The spathate scallop is represented by 10 specimens from 1 sample in the NEFC collection (Table 5).

Our sample is from the outer continental shelf southeast of the eastern tip of Long Island, N.Y. (Fig. 3; Theroux and Wigley footnote 4, table 4).

The main distribution is Boreal, Virginian, and Carolinian in American waters (Coomans 1962).

The spathate scallop is a moderately deep water inhabitant occupying depths which range from 92 to 1,449 m (Johnson 1934; Morris 1951).

Our sample is from a depth of 93 m in a clay bottom.

Genus *Argopecten* Monterosato 1889

***Argopecten gibbus* (Linné 1758). Calico scallop. Figure 9.**

The calico scallop occurs from off Maryland to Florida, in the Gulf of Mexico, and at south Texas (Johnson 1934; Morris 1951, 1973; Abbott 1968, 1974; Emerson et al. 1976).

Although *Argopecten gibbus* is a common, warm water, commercially important bivalve our collection contains only two specimens from two samples (Table 5) due to the lack of sampling activity by NEFC in its distributional range in comparison to that in more northerly areas.

Our samples are from the northern Florida continental shelf (Fig. 9; Theroux and Wigley footnote 4, table 14).

Published depth data for this species shows a distribution ranging from shallow water to 366 m (Abbott 1968, 1974; Morris 1973).

Our samples are from 28 and 35 m with a mean depth of 32 m. All samples and specimens are in the 25-49 m depth range grouping.

The samples are from sand substrates.

***Argopecten irradians* (Lamarck 1819). Atlantic bay scallop. Figure 9.**

The Atlantic bay scallop is an abundant, commercially important bivalve of the U.S. east coast, especially in the northeastern region, although elsewhere along the coast, where locally abundant, important fisheries also exist (Gutsell 1931; Marshall 1960; Clarke 1964).

Clarke (1964), in his review of the taxonomy of the genus *Aequipecten*, agreed with Abbott's (1954) differentiation of the *A. irradians* superspecies into three subspecies: *A. irradians* s.s., *A. i. concentricus* (Say), and *A. i. amplicostatus* (Dall), and added a new subspecies, *A. i. sablensis*, which occurs only at Cape Sable, Nova Scotia, to the list. Our specimens are *A. irradians* s.s..

Most published distributional records are for the so-called superspecies *A. irradians* which ranges from Newfoundland to Florida and Texas (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976). Gutsell (1931) listed the occurrence of this organism, in important commercial abundance, to range from Cape Cod to Bogue Sound, N.C., but cited other authors, namely Dall (1889, 1898), Belding (1910), Kellogg (1910), and Ingersoll (1887) who considered it distributed from Maine to Texas, the West Indies, and Brazil. Clarke (1964) considered the superspecies *A. i. irradians* to inhabit the region from the north shore of Cape Cod at Barnstable and Provincetown, Mass., to New Jersey with disjunct populations at Cohasset and Scituate, Mass.

Due to the restriction of this species to inshore habitats and the relatively few samples from these areas in our collection, we have only 5 samples containing 17 specimens of this animal (Table 5).

Our samples are all from the south shore of Cape Cod and adjacent Vineyard Sound (Fig. 9; Theroux and Wigley footnote 4, table 15).

The zoogeographic distribution of this species complex is Boreal, Virginian, and Carolinian in the western Atlantic, and Celtic for the genus in Europe (Coomans 1962); Gosner (1971) considered it Boreal and Virginian, while Dance (1974) placed it in the Transatlantic and Caribbean provinces.

The depth range of this species is relatively narrow restricting it to inshore embayments and sounds. Reported depths range from 0.3 to 18 m (Gutsell 1931; Abbott 1974).

Our samples range from 0 to 3 m with a mean of 1.2 m, placing them in our 0-24 m depth range grouping.

Argopecten irradians has a close affinity to eelgrass (Zostera) beds and other vegetation areas on bottom types composed of soft mud to hard, non-shifting sand (Gutsell 1931; Marshall 1960; Clarke 1964; Abbott 1974).

Thirty-three percent of our samples and specimens came from a sand-gravel bottom, 67% of each were in sand, while 2

samples containing 14 specimens had no sediment data included among recorded environmental parameters.

Genus *Chlamys* Bolten 1798

Chlamys islandica (Müller 1776). Iceland scallop. Figure 26.

This species is reported to occur from Arctic seas to Buzzards Bay, Mass., in the North Atlantic, and in the North Pacific ranges from Alaska south to Puget Sound, Wash. (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clark 1962; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976). In addition to giving a detailed description of the distribution of this species in Arctic regions, Ockelmann (1958) mentioned that in addition to published distributional records, dead shells have been found from Bohusland in Sweden, in the North Sea, west of Scotland, in Ireland, France, around the Azores, and in the Mediterranean Sea.

Chlamys islandica is a very common inhabitant of the cold waters of the North Atlantic and North Pacific Oceans. The NEFC collection contains 76 samples which yielded 361 specimens of this species (Table 5).

Our samples are from continental shelf areas north and east of Cape Cod, Mass., on Georges Bank, in the Gulf of Maine, and on the Scotian Shelf west of Nova Scotia (Fig. 26; Theroux and Wigley footnote 4, table 41).

Zoogeographic distribution of this species, according to Ockelmann (1958), is subarctic in both the North Atlantic and North Pacific Oceans; he reported it as continuously circumpolar and found lacking in typically high Arctic seas. Gosner (1971) placed it in the Boreal province in the North Atlantic, while Dance (1974) assigned it to the Arctic, the Boreal east of eastern North America, the Transatlantic, the Aleutian, and Californian provinces.

Although *Chlamys islandica* is primarily a continental shelf inhabitant it does range to continental slope depths with reported depth records showing it inhabiting water depths which range from 1.8 to 2,031 m (Clarke 1962; Abbott 1968, 1974).

The depth range of our samples is 40 to 421 m with a mean of 118 m. The majority of samples (53%) are in the 100-199 m depth range grouping, 38% in the 50-99 m grouping, 5% in the 200-400 m depth range grouping, and 4% in the 25-49 m grouping; whereas, the specimen distribution is 75% of the specimens in the 50-99 m grouping, 22% in the 100-199 m grouping, 2% in the 200-499 m grouping and < 1% in the 25-49 m grouping (Table 110).

Abbott (1968) reported that the Iceland scallop occurs on coarse sand sediments.

Our samples occurred in all but two of the nine sediment types included in this report. No specimens were obtained from shell or sand-shell substrates. Largest amounts of both samples and specimens occurred in the coarser grained substrate types, gravel, sand-gravel, till, and sand with significantly lesser amounts of each occurring in the finer grained sediments, silty sand, silt, and clay (Table 111). There are 28 samples containing 85 specimens which are unclassified with regard to sediment type.

Genus *Cyclopecten* Verrill 1897

Cyclopecten nanus Verrill and Bush 1897. Dwarf round scallop. Figure 40.

The dwarf round scallop occurs from off Virginia to Texas, and at Puerto Rico and Brazil (Johnson 1934; Warmke and Abbott 1961; Morris 1973; Abbott 1974).

The NEFC collection contains 21 specimens of this species from 3 samples (Table 5).

Our samples are located on the edge of the Continental shelf off Atlantic City, N.J. (Fig. 40; Theroux and Wigley footnote 4, table 64).

The depth range for this tiny species is 40 to 538 m (Abbott 1974).

Samples in our collection range from 89 to 102 m depth with a mean of 93 m. Two depth range groupings contain members of this species, the 50-99 m grouping with 67% of the samples and 52% of the specimens and the 100-199 m grouping containing 33% of the samples and 48% of the specimens (Table 112).

All of our samples were obtained in sand substrates (Table 113).

Cyclopecten pustulosus Verrill 1873a. Figure 40.

Cyclopecten pustulosus ranges from Newfoundland to Cape Cod and Martha's Vineyard, Mass. (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1974).

The NEFC Specimen Reference Collection contains 58 specimens from 30 samples of *Cyclopecten pustulosus* (Table 5).

Our samples are from north and east of Cape Cod, Mass., the Gulf of Maine, the Scotian Shelf, and on the outer continental slope south of Georges Bank (Fig. 40; Theroux and Wigley footnote 4, table 65).

The bathymetric range of this species is 211 to 787 m of water (Johnson 1934; Abbott 1974).

The range in depth of our samples is from 110 to 690 m with a mean of 218 m. Three depth range groupings are incuded in this bathymetric range with abundance decreasing with increasing depth range. The 100-199 m depth range grouping contains 63% of the samples and 54% of the specimens, while the 200-499 m grouping contains 30 and 43%, respectively; the 500-999 m grouping contains 7% of the samples and 3% of the specimens (Table 114).

There is no great disparity of abundance among the several sediment types in which this species was found. Twenty-four percent of the samples occurred in both sand-gravel and sand substrates which contained 16 and 14% of the specimens, respectively; 20% of the samples occurred in both till and silty sand where 32 and 14% of the specimens occurred, respectively; gravel substrates contained 8% of the samples and 23% of the specimens, while clay contained the least with 4% of the samples and 2% of the specimens (Table 115). There are 5 samples containing 14 specimens which are unclassified with regard to sediment type.

Genus *Delectopecten* Stewart 1920

***Delectopecten vitreus* (Gmelin 1791). Vitreous scallop. Figure 41.**

Johnson (1934), La Rocque (1953), Morris (1973), and Abbott (1974) reported the distribution of this species for U.S. waters as ranging from Newfoundland and Nova Scotia to Martha's Vineyard, Mass. In addition, Abbott (1974) stated that it is also found in northern Europe and at Clipperton Island in the eastern Pacific. Ockelmann (1958) listed the Arctic distribution, Clarke (1962) listed the worldwide distribution, and Tebble (1966) listed the northern European distribution for this species, he also mentioned the Indo-Pacific as a site of habitation.

This small, uncommon scallop is represented in the NEFC collection by 12 specimens from 3 samples (Table 5).

Our samples, two of which occurred at one sampling site, are from the edge of the continental shelf off the Northeast Peak of Georges Bank (Fig. 41; Theroux and Wigley footnote 4, table 68).

The vitreous scallop is a deep water scallop, ranging in depth from 28 to 4,258 m (Clarke 1962; Morris 1973).

The depth range of our samples is 412 to 549 m with a mean of 458 m. The 200-499 m depth range grouping contains 66% of both samples and specimens; the 500-999 m grouping contains the remaining 33% of each (Table 116).

Only one of our samples contains information regarding sediment type, it was obtained in till and contained four specimens (Table 117). The remaining two samples with eight specimens are unclassified with regard to bottom sediments.

Genus *Placopecten* Verrill 1897

***Placopecten magellanicus* (Gmelin 1791). Atlantic deepsea scallop. Figure 90.**

Placopecten magellanicus is one of the most valuable commerical shellfish resources of the U.S. east coast, especially in the northeast and middle Atlantic coastal regions, which in 1978 yielded approximately 31 million pounds of meats valued at $76.4 million in the United States, while Canada's catch was 26.7 million pounds (Pileggi and Thompson 1979).

The natural history of this species has been well documented in the literature, especially by investigators at the NEFC where, for many years, an investigation of the sea scallop fishery was active (see Merrill 1959b, 1960, 1961; Merrill and Burch 1960; Merrill and Posgay 1964; Merrill et al. 1966; Posgay 1957, among others). There is also extensive information from Canadian researchers.

It must be pointed out that the dta for this species contained in this report are solely based on collections which are currently, physically present in the NEFC collection. No data from the extensive sea scallop data base here at NEFC have been included in this analysis.

The Atlantic deepsea scallop is distributed from Newfoundland to North Carolina with a questionable record from Labrador (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Abbott 1968, 1974; Emerson et al. 1976.

There are 1,225 specimens of the sea scallop in the NEFC Specimen Reference Collection representing slightly over 1% of all specimens; these are from 164 samples accounting for nearly 2% of the samples in the bivalve collection (Table 5).

The NEFC samples are from the continental shelf in the northeastern region around the periphery of the Gulf of Maine, with large series of collections on the northeast peak of Georges Bank, extending south over the Southern New England Continental shelf into the Mid-Atlantic Bight region south to approximately the mouth of Chesapeake Bay (Fig. 90; Theroux and Wigley footnote 4, table 155).

This species inhabits the Boreal and Virginian provinces (Coomans 1962; Gosner 1971).

The depth range for the Atlantic deepsea scallop extends from offshore to moderately deep waters which range between 6 and 183 m (Johnson 1934; Abbott 1968).

Our samples are from depths which range from 36 to 293 m of water with a mean of 96 m. The majority of both samples and specimens are in the depth range groupings of the middle shelf regions. Sixty percent of the samples and 62% of the specimens are in the 50-99 m depth range grouping, while 31% of the samples and 33% of the specimens are in the 100-199 m grouping; significantly smaller amounts of both samples and specimens are in the 25-49 and 200-499 m groupings (Table 118).

Sea scallops were found in all sediment types considered in this report with the exception of till. The majority of both samples and specimens were obtained from sand substrates where 39% of the samples and 30% of the specimens occurred. Table 119 shows the distribution of both samples and specimens with regard to the other sediment types. There are 66 samples containing 603 specimens which are unclassified with regard to sediment type.

Genus *Propeamussium* Gregorio 1884

***Propeamussium thalassinum* (Dall 1886). Figure 95.**

This species ranges from off Martha's Vineyard, Mass., to the West Indies (Johnson 1934; Abbott 1974).

There are 28 specimens from 6 samples of *Propeamussium thalassinum* in the NEFC Specimen Reference Collection (Table 5).

Our samples are from the outer continental shelf and the upper continental slope between Cape Cod, Mass., and Atlantic City, N.J. (Fig. 95; Theroux and Wigley footnote 4, table 168).

Gosner (1971) placed *Propeaumussium thalassinum* in the Virginian zoogeographic province.

The depth range for this species as reported by Abbott (1974) is 40 to 580 m.

Our samples are from water depths which range between 84 and 201 m with a mean of 149 m. The 50-99 m depth range grouping contains 17% of the samples and 7% of the specimens; the 100-199 m grouping contains 67% of the samples and 50% of the specimens, and the 200-499 m grouping contains 17% of the samples and 43% of the specimens (Table 120).

Both gravel and sand sediments contained 25% of the samples, but 8 and 46%, respectively, for specimens, while silty sand sediments contained 50% of the samples and 46% of the specimens (Table 121). There are two samples containing two specimens which are unclassified with regard to sediment type.

Family PLICATULIDAE
Genus *Plicatula* Lamarck 1801

***Plicatula gibbosa* Lamarck 1801. Kitten's paw. Figure 91.**

The kitten's paw is distributed from North Carolina into the Gulf States and the West Indies; it also occurs at Bermuda and at Brazil (Johnson 1934; Morris 1973; Abbott 1968, 1974; Emerson et al. 1976).

Plicatula gibbosa is a common bivalve of which there are six specimens from four samples in our collection (Table 5).

Our samples are from the continental shelf with a series of samples off the North Carolina coast and another series off the northern and middle sections of Florida (Fig. 91; Theroux and Wigley footnote 4, table 158).

Depths at which kitten's paws are found range from the intertidal zone to approximately 140 m (Abbott 1968, 1974; Porter 1974).

The depth range for our samples is from 12 to 74 m with a mean of 37 m. The 0-24, the 25-49, and the 50-99 m depth range groupings each contain 33% of the specimens; however, in terms of sample distribution, 50% are in the 25-49 m grouping and 25% in each of the other two (Table 122).

Sediment types at sampling sites yielding specimens of kitten's paw were sand-shell and sand, with 75% of the samples and 83% of the specimens occurring in sand-shell, and 25% of the former and 17% of the latter in sand (Table 123).

Family SPONDYLIDAE
Genus *Spondylus* Linné 1758

***Spondylus* sp. Figure 102.**

There is one sample in the NEFC collection which contains two specimens of bivalves classified as *Spondylus* sp. (Table 5).

The sample containing *Spondylus* sp. is from the continental shelf north of Miami Beach, Fla. (Fig. 102; Theroux and Wigley footnote 4, table 182).

The water depth at the sampling site was 28 m which places it in the 25-49 m depth range grouping, and the bottom sediment type was sand.

Family ANOMIIDAE
Genus *Anomia* Linné 1758.

***Anomia simplex* Orbigny 1842. Common jingle shell. Figure 5.**

In the northwest Atlantic it occurs from Newfoundland to Florida; it is also found along the Gulf States, at Bermuda, the West Indies, and ranges into the Caribbean and to Cuba and Brazil (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

This small, very common bivalve occurs in nearly 3% of our samples and represents 10% of all specimens in our collection (Table 5).

The majority of our samples are in the Gulf of Maine-Georges Bank region on the continental shelf and slope. Sample density decreased rapidly with decreasing latitude south of Cape Cod, Mass., becoming sparse in the Middle Atlantic Bight shelf region. Only three samples south of Delaware Bay contained specimens (Fig. 5; Theroux and Wigley footnote 4, table 8).

The main distribution is Boreal, Virginian, Carolinian, and Caribbean in American waters, and Celtic in Europe for the genus and family (Coomans 1962); Gosner (1971) listed it as Boreal and Virginian, while Dance (1974) assigned it a Transatlantic and Caribbean distribution.

The common jingle shell has been reported from shallow, inshore waters (Abbott 1968; Morris 1973) to moderately deep (183 m) water (Gosner 1971).

The samples in our collection range in depth from 0 to 549 m with a mean of 120 m. The majority of samples (47%) and specimens (70%) are in the 50-99 m depth range grouping; abundance of both samples and specimens diminishes with increasing and decreasing depth range beyond this grouping (Table 124).

Specimens of *A. simplex* occurred in all sediment types considered in this report, usually attached to rocks, gravel, shells, or other debris. The majority of samples (33%) occurred in sand but significant amounts also occurred in the harder substrates; sand-gravel, gravel, and till (20, 14, and 13%, respectively); other sediment types contained 8% or less of the samples. Thirty-eight percent of the specimens occurred in sand, 31% in sand-gravel, and 17% in gravel. Each of the remaining sediment types contained 5% or less of the specimens (Table 125). There are 76 samples containing 1,902 specimens which are unclassified with regard to sediment type.

***Anomia squamula* Linné 1758. Prickly jingle shell. Figure 6.**

Anomia squamula is widely distributed throughout the Arctic and subarctic regions. Johnson (1934), La Rocque (1953), Abbott (1968, 1974), and Emerson et al. (1976) all listed it as occurring from Labrador to North Carolina; in addition La Rocque (1953) reported it from Denmark, and Abbott recorded it from North Europe. Ockelmann (1958) showed this species to be distributed from Newfoundland to Cape Cod on the North American continental shelf and from the Parry Islands to and including Labrador; he also reported it as occurring around Iceland, north and south Norway, including Lofoten and the Faroes. Clarke's (1962) distributional records include: Labrador, Newfoundland, North America, North Eurasia, Norway, and Western Europe. Morris (1973) reported it to occur from Maine to North Carolina.

This small, common bivalve occurs in nearly 3% of our samples representing nearly 4% of all specimens in our collection (Table 5).

Our samples are, for the most part, confined to the northern sector of the study area including the Scotian Shelf, the Gulf of Maine, and Georges Bank down to the Nantucket Shoals region; there are three samples below Cape Cod, one in Narragansett Bay, and the others on the continental shelf off Long Island, N.Y. (Fig. 6; Theroux and Wigley footnote 4, table 9).

The main distribution for this species is Boreal, Virginian, and Celtic (Coomans 1962).

Reported depths for this species range from 0 to 2,002 m (Johnson 1934; Clarke 1962).

Our samples range in depth from 13 to 549 m with a mean of 128 m. The majority of samples (75%) and specimens (69%) occupy mid to outer continental shelf depths between 50 and 200 m. A substantially smaller number of samples and specimens are in other depth ranges groupings (Table 126).

The prickly jingle shell is found on rocks and broken shells (Abbott 1974), and on stones and seaweed (Morris 1951).

Our samples occurred in all sediment types considered in this report. The coarser sediments, gravel, sand-gravel, till, and sand, contained the majority of samples (82%) and specimens (84%); finer sediments, not offering as good a substratum for attachment, accounted for significantly fewer samples and specimens (Table 127). There are 62 samples containing 1,148 specimens which are unclassified with regard to sediment type.

Family LIMIDAE
Genus *Limatula* Wood 1839.

***Limatula subauriculata* (Montagu 1808). Small-eared lima. Figure 51.**

The small-eared lima is widely distributed in the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Greenland to Puerto Rico and the West Indies; in the Pacific it ranges from Alaska to Mexico; it is also found in northwest Europe (Johnson 1934; La Rocque 1953; Morris 1973; Abbott 1974). The distribution of this species in Arctic regions is outlined by Ocklemann (1958), and for Europe and the British Isles by Tebble (1966).

Limatula subauriculata is a moderately common cool water bivalve which is represented by 328 specimens from 14 samples in the NEFC collection (Table 5).

Our samples occupy the edge of the continental shelf and mid to upper portions of the continental slope from Nova Scotia to slightly south of Delaware Bay (Fig. 51; Theroux and Wigley footnote 4, table 83).

This species occupies the subarctic-boreal and Mediterranean-Atlantic provinces (Ockelmann 1958).

The small-eared lima has a wide bathymetric range, being found in water depths from 4 to 1,830 m (Tebble 1966; Abbott 1974); in the Arctic, Ockelmann (1958) reported it to range from 7 m in the Faroes to possibly 3,300 m in depth.

Our samples range from 114 to 1,800 m in depth with a mean of 844 m. The majority of samples (43%) are in the 1,000-1,999 m depth range grouping; however, the largest number of specimens (93%) is in the 200-499 m grouping. Twenty-one percent of the samples are in both the 100-199 m and 200-499 m groupings while 14% of the samples are in the 500-999 m grouping. With regard to specimens the 100-199 m depth range grouping contains 2% of the specimens, the 1,000-1,999 m grouping, 5%, and less than 1% of the specimens are in the 500-999 m depth range grouping (Table 128).

This species is found in gravel, sandy gravel, and muddy substrates (Tebble 1966).

The majority of our samples (36%) occurred is silt, 29% of samples occurred in both sand and silty sand, and 7% of the samples occurred in sand-gravel substrates. The majority of specimens (94%) occurred in sand, while 3 and 2% occurred in silty sand and silt, respectively. Less than 1% occurred in sand-gravel (Table 129).

***Limatula* sp. Figure 51.**

There are 14 samples containing 22 specimens identified as *Limatula* sp. in the NEFC collection (Table 5).

The samples containing members of this genus are distributed from between Cape Hatteras and Cape Fear, N.C., to slightly north of Miami, Fla. (Fig. 51; Theroux and Wigley footnote 4, table 84).

Our samples range in depth from 22 to 595 m with a mean of 172 m. Thirty-six percent of the samples and specimens are in the 200-499 m depth range grouping; 22% of the samples and 14% of the specimens are in the 25-49 m grouping; the 0-24 m and 50-99 m groupings each contain 14% of the samples, but 27 and 9% of the specimens, respectively; the 100-199 m and 500-999 m groupings each contain 7% of the samples, but 9 and 5% of the specimens, respectively (Table 130).

Silt substrates contained 43% of the samples and 41% of the specimens while sand-shell and sand each contained 21% of the samples, and 32 and 18% of the specimens, respectively; sand-gravel and silty sand substrates contained 7% of the samples and 5% of the specimens, respectively (Table 131).

Family OSTREIDAE
Genus *Ostrea* Linné 1758.

***Ostrea* sp. Figure 79.**

The NEFC collection contains one specimen from one sample of an unidentifiable oyster which was classified to the generic level of *Ostrea* sp. (Table 5).

The single sample of this taxon is from the continental shelf south of Cape Fear, N.C. (Fig. 79; Theroux and Wigley footnote 4, table 135).

The depth of the water at the sampling site is 25 m, placing it in the 25-49 m depth range grouping; the sediment type is shell.

Genus *Crassostrea* Sacco 1897.

***Crassostrea virginica* (Gmelin 1791). American oyster. Figure 31.**

Crassostrea virginica is one of the most valuable of commercially exploited shellfish stocks. Oysters have been used by man since the dawn of history, and have existed as a group for millions of years. In 1978 total U.S. landings yielded 51 million pounds of meats valued at $60.9 million, an increase of 5 million pounds and $8.4 million compared with 1977 (Pileggi and Thompson, 1979).

This species is reported to occur from the Gulf of St. Lawrence to the Gulf of Mexico; it also occurs in the West Indies and at Panama (Johnson 1934; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Although the American oyster is very common within the area reported on, there is only one specimen from one sample in the NEFC collection (Table 5). This lack is a direct result of this organism's choice of habitat in the intertidal and subtidal regions of bays, sounds, and estuaries which are outside the area of responsibility of this Center.

The specimen in our collection is from shallow water in the midsection of Cape Cod, Mass. (Fig. 31; Theroux and Wigley footnote 4, table 49).

The zoogeographic distribution of this species includes the Boreal, Virginian, Carolinian, Caribbean, and Celtic provinces (Coomans 1962); Dance (1974) placed it in the Trans-

atlantic, Caribbean, and Boreal provinces and mentioned that it has been introduced into British waters.

As previously mentioned, this organism is primarily subtidal but ranges out to moderately shallow water. In the southern reaches of its range it does occur intertidally. The sample containing the one specimen of the American oyster in our collection is from a depth of 1 m.

Our sample has no sediment data associated with it. However, due to the life habits of the organism, it is normally found on hard bottom as a result of its habit of attaching itself to the substratum.

Subclass HETERODONTA
Order VENEROIDA
Family LUCINIDAE

The NEFC collection contains 166 specimens from 44 samples which are identified to the level of family Lucinidae (Table 5).

Samples containing members of this family occur in the middle and southern reaches of our study area from Chesapeake Bay southward to just north of Miami, Fla.; however, there is one sample from Buzzards Bay, Mass., which contains some members of this family (Fig. 56; Theroux and Wigley footnote 4, table 95).

Our samples range in depth from 4 to 53 m with a mean of 18 m. The majority of samples and specimens are in the shallowest depth range grouping, 0-24 m, which contains 82% of the samples and 93% of the specimens; 14% of the samples and 5% of the specimens are in the 25-49 m depth range grouping, and 5% of the samples and 1% of the specimens are in the 50-99 m grouping (Table 132).

Sand was the predominant substrate in which members of the family Lucinidae were found. This substrate contained 73% of the samples and 87% of the specimens; the next preferred substrate type was sand-shell which contained 23% of the samples and 11% of the specimens. Each of the following sediment types, shell and silty sand, contained 2.3% of the samples and 1.2 and 0.6% of the specimens, respectively (Table 133).

Genus *Lucinoma* Dall 1901. Figure 54.

Lucinoma blakeana Bush 1893.

This species occurs from Massachusetts Bay to off Cape Fear, N.C. (Johnson 1934; Abbott 1974).

Lucinoma blakeana is represented in the NEFC collection by 34 specimens from 6 samples (Table 5).

Our samples are from the continental shelf in the Middle Atlantic Bight region off New York (Fig. 54; Theroux and Wigley footnote 4, table 92).

The bathymetric range of this species is from 33 to 849 m depth (Johnson 1934; Abbott 1974).

Our samples occupy a depth range of between 84 and 266 m with a mean of 142 m. Fifty percent of the samples and 38% of the specimens are in the 50-99 m depth range grouping, while 33% of the samples and 59% of the specimens are in the 100-199 m grouping; 17% of the samples but only 3% of the specimens are in the deepest depth range grouping, 200-499 m (Table 134).

Our samples occurred in sand and silty sand substrates, each of which contained 50% of the samples, but 38 and 62% of the specimens, respectively (Table 135).

Lucinoma filosa (Stimpson 1851). Northeast lucina. Figure 55.

The northeast lucina has a fairly wide distribution ranging from Newfoundland to northern Florida and on to the Gulf States (Johnson 1934; Ockelmann 1958; Morris 1973; Abbott 1974).

This is a common offshore species having a fairly strong representation in the NEFC collection which contains 2,266 specimens from 241 samples (Table 5).

Samples in the NEFC collection occur throughout the study area; however, there is a greater concentration in the Southern New England shelf and slope region (Fig. 55; Theroux and Wigley footnote 4, table 93).

The zoogeographic distribution of this species is Boreal, Virginian, and Caribbean (Coomans 1962).

The northeast lucina is a moderately deep dwelling bivalve occupying water depths between 29 and 966 m (Johnson 1934). Morris (1973) stated that there is an increase in depth in which this species is found with a decrease in latitude.

Our samples are from water depths ranging between 15 and 1,408 m with a mean of 147 m. The majority of both samples and specimens are from mid-depth regions represented by the 50-99 m depth range grouping which contains 45% of the samples and 32% of the specimens and the 100-199 m grouping with 38 and 51%, respectively. Significantly smaller amounts of both samples and specimens occur in other depth range groupings (Table 136).

The northeast lucina was absent from coarser grained substrates but occurred in sand, sand-shell, and finer substrates. Sand yielded 42% of the samples and 39% of the specimens, silty sand 37% of the samples and 48% of the specimens. Other substrates in which this species was found were clay, with 14% of the samples and 11% of the specimens, silt with 5% of the samples and 1% of the specimens, and sand-shell with 2% of the samples and 0.4% of the specimens (Table 137).

Lucinoma sp. Figure 55.

The NEFC collection contains four specimens from four samples which bear the designation *Lucinoma* sp. (Table 5).

Members of the genus *Lucinoma* in our collection are from the continental shelf region in the Gulf of Maine and on the continental slope south of the Northeast Peak of Georges Bank (Fig. 55; Theroux and Wigley footnote 4, table 94).

Our samples are from depths which range between 23 and 1,240 m with a mean of 554 m. Twenty-five percent of the samples and 25% of the specimens occur in each of the following four depth range groupings: 0-24, 200-499, 500-999, and 1,000-1,999 m (Table 138).

Members of the genus *Lucinoma* were found in two sediment types, silty sand and silt which contained, with regard to both samples and specimens, 75% of each in the former and 25% of each in the latter (Table 139).

Genus *Myrtea* Turton 1822

***Myrtea pristiphora* Dall and Simpson 1902. Lamellated lucina. Figure 68.**

This species is found at Puerto Rico (Abbott 1974).

There are eight specimens from four samples of this species in the NEFC collection (Table 5).

The NEFC samples are from the continental shelf ranging from the central part to the southern tip of Florida (Fig. 68; Theroux and Wigley footnote 4, table 117).

Abbott (1974) reported the depth range for this species to be 55 to 82 m.

Our samples are from depths between 250 and 310 m with a mean of 281 m. All of our samples and specimens are in the 200-499 m depth range grouping.

Fifty percent of the samples occurred in each of two sediment types, silty sand and silt; silty sand substrates contained 75%, and silt, 25% of the specimens.

Genus *Parvilucina* Dall 1901

***Parvilucina blanda* (Dall and Simpson 1902). Three-ridged lucina. Figure 84.**

The distribution of this species is from North Carolina to Brazil (Abbott 1974).

Parvilucina blanda is a moderately common southern bivalve of which there are six specimens from five samples in the NEFC collection (Table 5).

The samples in the NEFC collection are distributed on the continental shelf from south of Cape Hatteras, N.C., to slightly north of Jacksonville, Fla. (Fig. 84; Theroux and Wigley footnote 4, table 144).

Abbott (1974) reported the depth range of this species to be from 18 to 37 m.

Our samples range in depth between 15 and 35 m with a mean of 26 m. The majority of both samples and specimens, 80% for the former and 83% for the latter, are in the 25-49 m depth range grouping with 20% of the samples and 17% of the specimens in the 0-24 m grouping (Table 140).

Sand was the predominant substrate type inhabited by *Parvilucina blanda* in our collection with 60% of the samples and 67% of the specimens occurring in this substrate type; both sand-shell and silty sand each contained 20% of the samples and 17% of the specimens (Table 141).

Family THYASIRIDAE
Genus *Axinopsida* Sars 1878

***Axinopsida orbiculata* (G. O. Sars 1878). Figure 17.**

The general distribution of this species is from Greenland to Casco Bay, Maine (Johnson 1934; La Rocque 1953; Abbott 1974). Ockelmann (1958) listed a widespread occurrence in Arctic regions and considered it to extend to north of Cape Cod, Mass. The distribution of variety *inaequalis* according to Johnson (1934) and Abbott (1974) is in the Bay of Fundy and the Gulf of Maine.

The NEFC collection contains one specimen of *Axinopsida orbiculata* from one sample (Table 5). Although a final determination has not yet been made, we suspect that, due to its distribution, it is the variety *inaequalis* Verrill and Bush 1898 of this species.

Our sample was obtained in Vineyard Sound, Mass. (Fig. 17; Theroux and Wigley footnote 4, table 26).

The zoogeographic provinces occupied by this species are the panarctic and Atlanto-arctic (Ockelmann 1958), while Gosner (1971) placed it in the Boreal.

In Atlantic waters, *A. orbiculata* is found at depths of from 18 to 55 m (Abbott 1974), while in the Arctic it ranges from 2 to 944 m (Ockelmann 1958). The variety *inaequalis*, according to Johnson (1934) and Abbott (1974), is found in waters from 33 to 64 m deep. Our specimen was captured at a depth of 3 m.

The only information pertaining to sediments we have found relates to our sample which was in a sand substrate.

Genus *Thyasira* Lamarck 1818

***Thyasira brevis* Verrill and Bush 1898. Figure 108.**

Johnson (1934), Clarke (1962), and Abbott (1974) reported this species as being distributed from Georges Bank to off Cape Hatteras, N.C.

There are three specimens of this uncommon tiny bivalve in the NEFC collection from one sample (Table 5).

Our sample is from the upper continental slope south of Nantucket Shoals, Mass. (Fig. 108; Theroux and Wigley footnote 4, table 195).

The bathymetric range of this bivalve is from 183 to 3,340 m (Abbott 1974).

Our sample is from a depth of 440 m which places it in the 200-499 m depth range grouping.

The sample was obtained from a sand bottom.

***Thyasira croulinensis* Jeffreys 1847. Figure 108.**

This species is widely distributed throughout Arctic regions, western Europe and into the Mediterranean Sea, it occurs from West Greenland to off Bermuda in the northwest Atlantic (Johnson 1934; La Rocque 1953, Ockelmann 1958; Clarke 1962; Tebble 1966; Abbott 1974).

This tiny bivalve is represented in the NEFC collection by four specimens from three samples (Table 5).

One of our samples is from the coast of Maine, another from the eastern portion of the Gulf of Maine, and the third sample is on the Southern New England shelf west of Nantucket Shoals (Fig. 108; Theroux and Wigley footnote 4, table 196).

Ockelmann (1958) reported that the species is low Arctic-boreal in distribution, it also occupies the Mediterranean-Atlantic province, and is abyssal.

Thyasira croulinensis enjoys a wide bathymetric range, occupying water depths which range from 7 to 2,700 m (Clarke 1962; Tebble 1966).

Our samples are from water depths which range between 49 and 353 m with a mean of 153 m. In terms of depth range groupings, 33% of the samples are in each of the 25-49, 50-99, and the 200-499 m groupings, while the distribution of specimens was 25% in the 25-49 and 50-99 m groupings, and 50% of the specimens are in the 200-499 m grouping (Table 142).

Three sediment types each contained 33% of the samples; these were till, silty sand, and silt substrates. In terms of specimens, till and silt contained 25%, while silty sand substrates contained 50% of the specimens (Table 143).

***Thyasira elliptica* Verrill and Bush 1898. Figure 108.**

Johnson (1934), Clarke (1962), and Abbott (1974) all stated that this species is found off Martha's Vineyard, Mass.

The NEFC collection contains 12 specimens from 4 samples of this rather rare bivalve species (Table 5).

Our samples are from the New England region, one sample off the coast of Maine, two south of Martha's Vineyard, Mass., at the edge of the continental shelf, and another in the Middle Atlantic Bight off Long Island, N.Y. (Fig. 108; Theroux and Wigley footnote 4, table 197).

The above cited authors all state one depth occurrence for this species at 2,655 m.

Our samples containing *Thyasira elliptica* are from water depths which range between 64 and 114 m with a mean of 91 m. Seventy-five percent of the samples and 92% of the specimens are in the 50-99 m depth range grouping, and 25% of the samples and 8% of the specimens are in the 100-199 m grouping (Table 144).

Clay substrates contained 75% of the samples and 67% of the specimens, while sand sediments contained 25% of the samples and 33% of the specimens (Table 145).

***Thyasira equalis* Verrill and Bush 1898. Figure 109.**

This species occurs in various sections of the Arctic, the north Eurasian continent and Norway, and in the northwest Atlantic it ranges from Nova Scotia to Chesapeake Bay (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1974).

Thyasira equalis is represented in the NEFC collection by 309 specimens from 44 samples (Table 5).

The NEFC suite of samples ranges from the environs of Nova Scotia down through the Gulf of Maine and Georges Bank region to the Middle Atlantic Bight region off Atlantic City, N.J. (Fig. 109; Theroux and Wigley footnote 4, table 198).

Ockelmann (1958) considered the distribution of this species as being probably panarctic and abyssal in the North Atlantic only.

The above cited authors report the depth range for this species as occurring between 172 to 2,813 m.

Our samples are from depths which range between 37 and 2,910 m with a mean of 283 m which could possibly be an extension of existing depth records. In terms of depth range groupings the mid-depth groupings contain almost equal amounts of samples and specimens. In order of increasing depth range the abundance of samples and specimens is as follows: the 25-49 m depth range grouping contains 5% of the samples and 3% of the specimens; the 50-99 m grouping, 14% of the samples and 19% of the specimens; the 100-199 m grouping contains 34% of the former and 28% of the latter, while the 200-499 m grouping contains the same amount of samples (34%) and 25% of the specimens; the 500-999 m grouping contains 11% of the samples and 25% of the specimens, while the 2,000-3,999 m grouping contains 2% of the samples and 0.3% of the specimens (Table 146).

Members of this species were obtained from four sediment types. Sand substrates contained 11% of the samples and 12% of the specimens; silty sand contained 32% of the samples and 36% of the specimens; silt sediments contained 7% of the former and 4% of the latter, while clay contained the largest amounts, 50% of the samples and 48% of the specimens (Table 147).

***Thyasira ferruginea* Winckworth 1932. Figure 110.**

This species enjoys a wide distribution in both Atlantic and Pacific Oceans and also extends possibly worldwide. In the Atlantic it ranges from Arctic seas to off North Carolina, while in the North Pacific it ranges from the Aleutian Islands to Alaska; it also occurs at Scotland and the North Sea, in the Mediterranean, and at the Madeira Islands; it has also been reported from off the coast of Africa, off the coast of India, and possibly into Antarctic regions; it has also been recorded from the Mid-Atlantic Ridge region (Johnson 1934; La Rocque 1953; Clarke 1962; Tebble 1966; Abbott 1974).

Our collection contains 1,381 specimens from 92 samples of this small bivalve species which, among the members of the genus *Thyasira*, is the most abundant in our waters (Table 5).

Our samples are distributed from the northeast peak of Georges Bank on the upper reaches of the continental slope, south to Cape Hatteras, N.C., with one sample occurring in the complex of Massachusetts and Cape Cod bays (Fig. 110; Theroux and Wigley footnote 4, table 199).

As well as enjoying wide geographic distribution, this species is also widely distributed with depth ranging from 20 to 3,000 m (Clarke 1962; Tebble 1966).

The NEFC samples are from water depths which range between 41 and 2,715 m with a mean of 1,388 m. The 25-49 m and the 50-99 m depth range groupings each contain 1% of the samples and $< 0.5\%$ of the specimens; the 200-499 m grouping contains 8% of the samples and 6% of the specimens, while the 500-999 m grouping contains 28% of the samples and the largest amount of specimens, 54%; the 1,000-1,999 m grouping contains the largest amount of samples, 37%, and 20% of the specimens, while the 2,000-3,999 m grouping contains 25% of the samples and 20% of the specimens (Table 148).

Thyasira ferruginea appears to prefer silty substrates to others for its habitat. Silty sand substrates contained 26% of the samples and 45% of the specimens, while silt sediments contained 50% of the samples and 43% of the specimens; clay sediments contained 15% of the samples and 5% of the specimens with sand containing the smallest amounts of both, 9% of samples and 6% of specimens (Table 149).

***Thyasira flexuosa* Verrill and Bush 1898. Figure 111.**

This species is reported to occur in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Greenland to off North Carolina but has also been reported from Norway, Western Europe, and the Mediterranean; whereas in the Pacific it ranges from the Bering Sea to off San Diego, Calif. (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1974).

This tiny bivalve is represented in the NEFC collection by 1,044 specimens from 104 samples each of which make up 1% of their respective groups (Table 5).

Our samples are from the Gulf of Maine-Nova Scotian shelf region, around the periphery of Georges Bank, south onto the Southern New England continental shelf and slope region, with two samples, in deep water, off the mouth of Chesapeake Bay (Fig. 111; Theroux and Wigley footnote 4, table 200).

Ockelmann (1958) mentioned in his report on the Arctic bivalves "In all probability, *T. flexuosa* has a boreal-lusitanian main distribution and is absent from arctic waters."

The reported depth range for this species is from 4 to 2,006 m (Clarke 1962).

Our samples are from depths which range between 16 and 1,550 m with a mean of 170 m. In terms of depth range groupings the majority of both samples and specimens are more plentiful in the mid-continental shelf to upper slope water depth ranges, with 31% of the samples and 59% of the specimens in the 50-99 m grouping, and 34% of the samples and 17% of the specimens in the 100-199 m grouping; the 200-499 m depth range grouping contains 22% of the samples and 13% of the specimens. Significantly smaller amounts occur on either side of these depth ranges, with 1% of the samples and 0.2% of the specimens in the 0-24 m grouping, 9% of the samples and 7% of the specimens in the 25-49 m grouping, 3% of the samples and 4% of the specimens in the 500-999 m grouping, and 1% of the samples and 0.1% of the specimens in the 1,000-1,999 m grouping (Table 150).

Thyasira flexuosa specimens were found in all sediment types considered in this report; however, they were most abundant in the medium-coarse to fine grained sediments with smallest amounts occurring in the coarser grained fractions. Silty sand substrates contained 20% of the samples and 38% of the specimens, while clay substrates contained 32% of the samples and 32% of the specimens; silt sediments contained 11% of the samples and 15% of the specimens, while sand contained 28% of the samples and 12% of the specimens. Gravel, sand-gravel, till, shell, and sand-shell substrates contained between 1 and 4% of the samples and from 1.3 to 0.1% of the specimens (Table 151).

***Thyasira flexuosa* forma *gouldii* Philippi 1845. Flexuose cleft clam. Figure 112.**

The flexuose cleft clam occurs in both the North Atlantic and North Pacific Oceans and is fairly widely distributed throughout Arctic regions. In the Atlantic it ranges from Greenland and Labrador to Cape Hatteras, N.C.; in the North Pacific it ranges from the Bering Sea to off San Diego, Calif.; it is also reported from northern Eurasian waters and in northern European waters (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Morris 1973; Abbott 1974).

This tiny common bivalve is represented in the NEFC collection by 415 specimens from 37 samples (Table 5).

Our samples are from the Gulf of Maine region, the Cape Cod region, and the periphery and the outer aspects of Georges Bank onto the Mid-Atlantic continental shelf, with two samples in slope water off the mouth of Chesapeake Bay (Fig. 112; Theroux and Wigley footnote 4, table 201).

Ockelmann (1958) considered this to be a panarctic species and stated that it probably is continuously circumpolar, while Coomans (1962) placed it in the Arctic, Boreal, Virginian, and Carolinian provinces in the northwest Atlantic and Celtic in European waters; Gosner (1971) placed it in the Boreal province.

The reported depth range for this species is from 2 to 2,685 m (Clark 1962).

Our samples are from water depths which range between 32 and 720 m with a mean of 155 m. In terms of depth range groupings, this species seems to prefer the mid-continental shelf depth grouping, 50-99 m, in which 57% of the samples and 55% of the specimens are grouped; the 100-199 m grouping contains 22% of the samples and 5% of the specimens; the 200-499 m and the 500-999 m groupings each contain 8% of the samples but 4 and 27%, respectively, of the specimens; the only other range grouping in which specimens of this species are grouped is the 25-49 m grouping which contains 5% of the samples and 9% of the specimens (Table 152).

As with other members of this genus the medium to fine substrates appear to be preferred above coarser ones. The majority of both samples and specimens occurred in silty sand substrates which contained 38% of the samples and 45% of the specimens; sand sediments contained 33% of the samples and 11% of the specimens, while clay substrates contained 22% of the samples and 34% of the specimens; silt sediments contained 5% of the samples and 10% of the specimens, while sand-gravel, the only coarse grained substrate in which members of this genus were found, contained 3% of the samples and 0.5% of the specimens (Table 153).

***Thyasira pygmaea* Verrill and Bush 1898. Figure 113.**

Johnson (1934), La Rocque (1953), and Abbott (1974) report this species as occurring from Halifax, Nova Scotia, to Martha's Vineyard, Mass.

There are 64 specimens from 8 samples of this small bivalve species in the NEFC collection (Table 5).

Our samples are from the continental slope southeast of Nova Scotia, in the Gulf of Maine, the outer aspects of the Georges Bank continental slope, and two samples on the southern New England continental shelf south of Nantucket Shoals (Fig. 113; Theroux and Wigley footnote 4, table 202).

The depth range for this species, according to the above-cited authors, is 377 to 913 m.

Our samples are from depths which range between 62 and 720 m with a mean of 308 m. The majority of both samples and specimens are in the 200-499 m grouping which contains 38% of the samples and 45% of the specimens; the 50-99 m and the 500-999 m groupings each contain 25% of the samples and 28 and 25% of the specimens, respectively; smallest amounts are in the 100-199 m grouping which contains 13% of the samples and 2% of the specimens (Table 154).

Thyasira pygmaea was found in three sediment types with the majority of both samples and specimens occurring in clay substrates which contained 50% of the samples and 56% of the specimens; silty sand substrates yielded 38% for samples and 41% of the specimens; sand substrates accounted for 13% of the samples and 3% of the specimens (Table 155).

***Thyasira subovata* Jeffreys 1881. Figure 113.**

Both Johnson (1934) and Abbott (1974) listed this species as occurring off Martha's Vineyard, Mass., while Clarke (1962) reported that it occurs in North American waters, western European waters, and at the Canary Islands.

The NEFC collection contains 18 specimens from 7 samples of this uncommon species (Table 5).

Our samples are from the Southern New England continental shelf and slope region south of Nantucket Shoals (Fig. 113; Theroux and Wigley footnote 4, table 203).

Both Johnson and Abbott reported a 915 m depth for this species, while Clarke (1962) listed it as occurring between 300 to 2,564 m.

Our samples are from depths which range from 62 to 567 m with a mean of 256 m. Fifty-seven percent of the samples and 44% of the specimens are in the 50-99 m grouping, 29% of the samples and 50% of the specimens in the 200-499 m grouping, and 14% of the samples and 6% of the specimens are in the 500-999 m grouping (Table 156).

Thyasira subovata specimens were found in four sediment types with 43% of the samples and 56% of the specimens occurring in silt substrates, and 29% of the samples and 28% of the specimens occurring in sand substrates; both silty sand and clay substrates each contained 14% of the samples, but 11 and 6%, respectively, for specimens (Table 157).

***Thyasira trisinuata* Orbigny 1842. Atlantic cleft clam. Figure 114.**

It occurs in both the North Atlantic and North Pacific Oceans and ranges from Labrador and Nova Scotia to the southern half of Florida, and on into the West Indies in the Atlantic; in the Pacific it ranges from Alaska to San Diego, Calif. An interesting observation is that at least for the northwest Atlantic there appears to be an increase in depth occurrence with decreasing latitude (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1968, 1974; Morris 1973).

Thyasira trisinuata is moderately common; the NEFC collection contains 1,079 specimens of this species from 133 samples (Table 5).

The NEFC samples range from the environs of the Nova Scotian shelf, in the inshore regions of the Gulf of Maine, onto the Southern New England shelf and south to Miami, Fla., with, as mentioned earlier, increasing depth occurrence with decreasing latitude (Fig. 114; Theroux and Wigley footnote 4, table 204).

Coomans (1962) placed the Atlantic cleft clam in the Boreal, Virginian, Carolinian, and Caribbean zoogeographic provinces while Gosner (1971) placed it in the Boreal and Virginian provinces.

The reported depth range for this species is from 22 to 2,361 m with the possibility of abyssal records having been transported from shallow waters (Clarke 1962). Other authors report the deepest depth recorded as being 351 m (Johnson 1934; Abbott 1968, 1974).

Our samples are from depths ranging between 23 and 2,520 m with a mean of 156 m. All of the depth range groupings in this report contain specimens and samples of the Atlantic cleft clam with the majority in the mid-continental shelf depth range grouping of 50-99 m which contains 61% of the samples and 62% of the specimens. The 100-199 m grouping contains 22% of the samples and 17% of the specimens, while the 200-499 m grouping contains 8% of the samples and 12% of the specimens; other depth range groupings contain significantly smaller amounts, the shallowest (0-24 m), and the two deepest groupings (1,000-1,999 and 2,000-3,999 m) each contain < 1% of both samples and specimens (Table 158).

Specimens of the Atlantic cleft clam were found in all sediment types, except shell; however, sand and silty sand contained the majority of both samples and specimens, silty sand was first with 40% of the samples and 53% of the specimens while sand sediments contained 35% of the samples and 26% of the specimens; clay substrates contained 15% of the samples and 12% of the specimens, all other sediment types, gravel, sand-gravel, till, and silt contained 5% or less of both samples and specimens (Table 159).

***Thyasira* sp. Figure 115.**

One of the reasons for the moderately large number of specimens (734) and samples (142) of this genus in the NEFC collection is the fact that this bivalve is tiny and has a very soft, thin shell which is easily eroded in preservative. This shell erosion results in only the soft parts of the organism remaining in samples with subsequent difficulty in arriving at a species determination (Table 5).

Samples yielding specimens of the genus *Thyasira* in our collection are from two major regions, one of which is the Gulf of Maine proper, and another suite of samples from the outer continental shelf and upper slope regions beginning on the northeast peak of Georges Bank and extending south to approximately Cape Hatteras, N.C. (Fig. 115; Theroux and Wigley footnote 4, table 205).

The depth range of samples containing *Thyasira* sp. is 15 to 2,645 m with a mean of 295 m. The mid to lower continental shelf depth range groupings contain the majority of both samples and specimens while groupings on either side of the central portion contain significantly fewer samples and specimens. The 100-199 m grouping contains 31% of the samples and 31% of the specimens, while the 200-499 m grouping contains 35% of the samples and 23% of the specimens; 11% of the samples and 23% of the specimens are in the 500-999 m grouping, and 13% of the samples and 18% of the specimens in the 50-99 m grouping; the 0-24, 25-49, 1,000-1,999, and 2,000-3,999 m groupings contain significantly smaller amounts of both samples and specimens (Table 160). There is one sample containing three specimens which does not contain any depth information.

The only sediment type devoid of specimens of this genus was shell. The majority of both samples and specimens occurred in the finer grained substrates with clay containing 34% of the samples and 33% of the specimens; silty sand yielded 30% of the samples and 31% of the specimens; silt contained 16% of the samples and 19% of the specimens, and sand substrates, 11% of the samples and 11% of the specimens. Considerably smaller amounts occurred in gravel, sand-gravel, and till (Table 161). There are 8 samples containing 33 specimens which are unclassified with regard to sediment type.

Family UNGULINIDAE
Genus *Diplodonta* Bronn 1831

***Diplodonta* sp. Figure 42.**

There are 90 specimens from 58 samples classified as *Diplodonta* sp. in the NEFC collection (Table 5).

The distribution of samples containing members of this taxon occurs in two groupings, one off Chesapeake Bay over the edge of the continental shelf north of Cape Hatteras, N.C., the other on the continental shelf ranging from south of Cape Hatteras, N.C., to Miami, Fla. (Fig. 42; Theroux and Wigley footnote 4, table 69).

Our samples are from water depths ranging from 7 to 1,615 m with a mean of 63 m. Placement of samples in depth range

groupings shows a diminution in abundance of both samples and specimens with increasing water depth range. Greatest amounts are in the 0-24 depth range grouping which contains 43% of the samples and 38% of the specimens; the 25-49 m depth range grouping contains 40% of the samples and 34% of the specimens while the 50-99 m grouping contains 14 and 21%, respectively; 2% of the samples occur in the 200-499 and 1,000-1,999 m depth range groupings, each of which contained 1 and 6%, respectively, of the specimens (Table 162).

Members of the genus *Diplodonta* occurred in sand-shell, sand, silty sand, and silt sediments. Sand-shell sediments contained 19% of the samples and 18% of the specimens, while sand substrates yielded 74% of the samples and 73% of the specimens; amounts diminished as particle size diminished. Silty sand contained 5% of the samples and 3% of the specimens while silt contained 2% of the samples and 6% of the specimens (Table 163).

Family CHAMIDAE
Genus *Arcinella* Oken 1815

***Arcinella cornuta* Conrad 1866. Florida spiny jewel box. Figure 7.**

This species occurs from North Carolina to Florida and the West Indies in the Atlantic and from the west coast of Florida to Texas in the Gulf of Mexico (Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Our collection contains three specimens from three samples of this common bivalve (Table 5), the samples are from the continental shelf between Charleston, S.C., and Jacksonville, Fla. (Fig. 7; Theroux and Wigley footnote 4, table 12).

Abbott (1968, 1974) reported a depth range of 3.7 to 73 m for this species.

Our samples range in depth from 19 to 35 m with a mean of 29 m. Thirty-three percent of samples and specimens are in the 0-24 m depth range grouping, the remaining samples and specimens (67% for each) are in the 25-49 m depth range grouping (Table 164).

The only mention of sediment relation in reports we have seen is a reference to this species being found on old shells (Abbott 1968). Sixty-seven percent of our samples and specimens occurred in sand, and 33% of each were from a sand shell substratum (Table 165).

Family CARDIIDAE
Genus *Chama* Linné 1758

***Chama* sp. Figure 24.**

The NEFC collection contains one sample containing one specimen of material which was identified to the generic level of *Chama* sp. (Table 5).

The sample containing the specimen is from off Miami, Fla. (Fig. 24; Theroux and Wigley footnote 4, table 37).

Our sample of *Chama* is from a water depth of 42 m in a substrate of sand.

Family LASAEIDAE
Genus *Aligena* Lea 1843

***Aligena elevata* (Stimpson 1851). Eastern aligena. Figure 3.**

The eastern aligena is distributed from Massachusetts to North Carolina (Johnson 1934; Abbott 1974; Emerson et al. 1976).

There are two samples containing three specimens of this species in the NEFC collection (Table 5). Abbott (1974) and Emerson et al. (1976) considered it a common species.

Our samples are from Nantucket Sound and just off the outer shore of Long Island, N.Y. (Fig. 3; Theroux and Wigley footnote 4, table 5).

Abbott (1974) reported that the depth range of *A. elevata* is from the shoreline to 18 m, while Porter (1974) reported it from 0.3 to 11 m.

Our two samples are from 18 and 31 m depths with a mean of 25 m. Two specimens occurred in the shallower depth and one at the deeper site.

Both of our samples for this species were in a sand substratum.

Family LEPTONIDAE
Genus *Montacuta* Turton 1822

***Montacuta* sp. Figure 63.**

The NEFC collection contains one specimen from one sample of this genus (Table 5).

The sample in the NEFC collection is from inshore waters at the elbow of Cape Cod, Mass. (Fig. 63; Theroux and Wigley footnote 4, table 109). The depth from which this sample was taken is 18 m which places it in the 0-24 m depth range grouping. The sediment type was sand.

Genus *Mysella* Angas 1877

***Mysella* sp. Figure 69.**

The NEFC Specimen Reference Collection contains two members of this genus from one sample (Table 5).

Our sample is from the upper portion of the continental slope off the midsection of the Florida Peninsula (Fig. 69; Theroux and Wigley footnote 4, table 118). The sample was in a water depth of 400 m placing it in the 200-499 m depth range grouping. Substrate type at the sampling site was silt.

Family TURTONIIDAE
Genus *Turtonia* Alder 1848

***Turtonia* sp. Figure 115.**

Our collection contains one sample which yielded one specimen of the genus *Turtonia* (Table 5).

Our sample is from the northern edge of Browns Bank (Fig. 115; Theroux and Wigley footnote 4, table 206). The sample is from a water depth of 119 m placing it in the 100-199 m depth range grouping, and is from a gravel substratum.

Family CARDITIDAE
Genus *Cyclocardia* Conrad 1867

Cyclocardia borealis (Conrad 1831). Northern cardita. Figure 38.

The northern cardita is reported from both the North Atlantic and North Pacific Oceans, but is more common in the North Atlantic extending from the Arctic Ocean to Cape Hatteras, N.C., while in the Pacific it ranges from the Arctic Ocean to Oregon; it is also found in subarctic regions, ranging from the Parry Islands to and including Labrador (Dall 1902b; Johnson 1934; Morris 1951, and 1973; La Rocque 1953; Ockelmann 1958; Abbott 1974; Emerson et al. 1976).

Cyclocardia borealis is a very common bivalve species in the northwest Atlantic. This commonness is reflected in the NEFC collection where there are 475 samples, representing 4.5% of all samples, containing 8,842, or 8.1% of all specimens (Table 5).

The NEFC samples are from continental shelf and slope waters in the northern reaches of the study area including the Scotian Shelf on the east and west coasts of Nova Scotia, throughout the Gulf of Maine-Georges Bank complex, on the Southern New England shelf and slope to north and east of Cape Hatteras, N.C. (Fig. 38; Theroux and Wigley footnote 4, table 61). There are two apparently disparate samples, one south of Charleston, S.C., on the continental shelf and the other in the inner Florida Keys; these will be investigated further to determine whether they are range extensions or not.

The zoogeographic range is Boreal and Virginian (Coomans 1962; Gosner 1971); whereas, Dance (1974) listed it as occurring in the Boreal and Transatlantic provinces.

The bathymetric range is 1.8 to 796 m (Abbott 1968; Porter 1974).

Our samples are from depths between 15 and 293 m with a mean of 91 m. The 50-99 m depth range grouping contains 56% of the samples and 63% of the specimens; next greatest amounts are in the 100-199 m grouping which contains 24 and 25% of samples and specimens, respectively. The 25-49 m grouping contains 13% of the samples and 11% of the specimens; the 0-24 m grouping 3 and 0.4%, respectively, while the 200-499 m grouping contains 4.4 and 1% of samples and specimens, respectively (Table 166). Two samples containing three specimens have no associated depth information.

Specimens of the northern cardita were found in all of the sediment types considered in this report. The greatest number of samples (36%) were found in sand, but the largest number of specimens (38%) were obtained in till. Sand, silty sand, and clay substrates contained between 15 and 22% of the specimens in each type and silty sand and clay contained 13 to 14% of the specimens (Table 167). Forty-five samples containing 148 specimens are unclassified with regard to sediment type.

Cyclocardia novangliae (Morse 1869). Figure 39.

For many years *Cyclocardia novangliae* has been considered to be a variety of *Cyclocardia borealis*. It has recently achieved the status of a valid species (J. J. Kosmark[5]).

The range of this species extends from Newfoundland to Cape Cod, Mass. (Johnson 1934; La Rocque 1953). Abbott (1974) reported it to be distributed from Nova Scotia to New York.

There are 89 specimens from 26 samples of this species in the NEFC collection (Table 5).

The samples in our collection are from the Nova Scotian banks and shelf, the Gulf of Maine continental shelf off the coast of Maine, and the Northeast Peak of Georges Bank as well as Great South Channel southeast of Cape Cod (Fig. 39; Theroux and Wigley footnote 4, table 62).

The range in depth from which our specimens were obtained is 46 to 249 m with a mean of 95 m. The 50-99 m depth range grouping contains the largest amount of both samples (65%) and specimens (90%). Twenty-three percent of the samples and 7% of the specimens are in the 100-199 m depth range grouping, 8% of the samples and 2% of the specimens occur in the 25-49 m grouping, and 4 and 1%, respectively, in the 200-499 m grouping (Table 168).

Sand-gravel was the predominant substrate type containing 44% of the samples and 43% of the specimens, while gravel, although containing 20% of the samples, contained only 7% of the specimens; till substrates yielded 12% of the samples and 27% of the specimens; shell and sand each contained 8% of the samples but 18 and 2% of the specimens, respectively; both clay and sand-shell each contained 4% of the samples and 1% of the specimens (Table 169). There is one sample containing one specimen which is unclassified with regard to sediment type.

Cyclocardia sp. Figure 39.

There are 22 specimens from 16 samples in the NEFC collection which are identified as *Cyclocardia* sp.(Table 5).

The NEFC samples of this taxon are located on the continental shelf from Cape Hatteras southward to just north of Miami, Fla. (Fig. 39; Theroux and Wigley footnote 4, table 63).

Water depths at which our samples of *Cyclocardia* were obtained range between 8 and 80 m with a mean of 30 m. Three depth range groupings are involved with this distribution, 50% of the samples and 59% of the specimens are in the 0-24 m depth range grouping, 38% of the samples and 32% of the specimens are in the 25-49 m grouping, and 13 and 9% of samples and specimens, respectively, are in the 50-99 m grouping (Table 170).

Fifty percent of the samples and specimens occurred in sand-shell substrates while sand sediments contained 31 and 32%, respectively. Each of the following sediment types contained 6% of the samples: gravel, shell, and silty sand; gravel and shell substrates contained 5% of the specimens, while 9% of the specimens were obtained from silty sand substrates (Table 171).

[5]J. J. Kosmark, graduate student, Graduate School of Oceanography, University of Rhode Island, Kingston, RI 02881, pers. Commun. May 1978.

Genus *Pleuromeris* Conrad 1867

***Pleuromeris tridentata* (Say 1827).[6] Three-toothed cardita. Figure 91.**

The three-toothed cardita is distributed from North Carolina to all of Florida and into the Gulf of Mexico (Johnson 1934; Morris 1973; Abbott 1974).

Pleuromeris tridentata is represented in the NEFC Specimen Reference Collection by 168 specimens from 61 samples (Table 5).

Our samples are from the continental shelf between Cape Hatteras, N.C., and the Florida Keys (Fig. 91; Theroux and Wigley footnote 4, table 157).

Pleuromeris tridentata is commonly found in moderately shallow to moderately deep water which ranges from 0.3 to 227 m (Johnson 1934; Porter 1974).

Our samples are from depths which range between 9 and 233 m with a mean of 33 m. The bulk of our samples are in the 0-24 m and 25-49 m depth range groupings which contain 43 and 32% of the samples and specimens, respectively, in the former and 44 and 56% of the samples and specimens in the latter; 10% each of samples and specimens are in the 50-99 m grouping while 2 and 1%, respectively, are in the 100-199 m and 200-499 m depth range groupings (Table 172).

Samples containing the three-toothed cardita were obtained from gravel, shell, sand-shell, sand, and silty sand substrates. Sand sediments contained the greatest amount of both samples and specimens which was 48 and 66%, respectively, while sand-shell was next with 41% of the samples and 23% of the specimens. Significantly lower amounts occurred in the other sediment types (Table 173).

Genus *Pteromeris* Conrad 1862

***Pteromeris perplana* (Conrad 1841a). Flattened cardita. Figure 96.**

This species occurs from North Carolina to Florida and is also found in the Gulf of Mexico (Morris 1973; Abbott 1974; Porter 1974).

Pteromeris perplana is a common bivalve represented in our collection by 28 specimens from 14 samples (Table 5).

Our samples are from the continental shelf between Cape Fear, N.C., and slightly north of Miami, Fla. (Fig. 96; Theroux and Wigley footnote 4, table 169).

Depths in which this species is found range between 2 and 116 m of water (Abbott 1974; Porter 1974).

Our samples are from water depths which range between 10 and 43 m with a mean of 30 m. The majority of both samples and specimens are in the 25-49 m depth range grouping which contains 79% of the samples and 89% of the specimens; the 0-24 m grouping contains 21% of the samples and 11% of the specimens (Table 174).

The flattened cardita samples were obtained from four sediment types: sand-gravel contained 7% of the samples and 4% of the specimens; shell contained 14% of the samples and 7% of the specimens; sand-shell contained 21% of the samples and 36% of the specimens; and sand contained 57% of the samples and 54% of the specimens (Table 175).

Family ASTARTIDAE
Genus *Astarte* Sowerby 1816

***Astarte borealis* (Schumacher 1817). Boreal astarte. Figure 10.**

This species is reported to occur from Arctic seas and Greenland to Massachusetts in the North Atlantic, and from Alaska to Japan in the North Pacific (Johnson 1934; Clarke 1962; Tebble 1966; Morris 1973; Abbott 1974; Emerson et al. 1976). Ockelmann's (1958) records for Arctic regions are quite extensive showing the boreal astarte occurring at East and West Greenland, Jan Mayen, Spitzbergen, Franz Joseph Land, Novaya Zemblya, the White Sea, along the Murman Coast, Finmark, in the Barents, Kara, and Siberian Ice Seas, in the Bering Sea and Strait in Alaska, the seas north of America, Grinnell Land, Baffinland, the Parry Islands, Hudson Strait, Labrador, Newfoundland, Nova Scotia, Iceland, Massachusetts Bay, off Norway south to Bergen, in the northern part of the North Sea, the Kattygat, Danish Belts, the Sounds in the Baltic to east of Bornholm. In the Pacific it extends southward from the Sea of Okhotsk to the Aleutians, Japan, and Forrester Island.

The boreal astarte, a common bivalve of North Atlantic waters, is represented in our collection by 22 specimens from 18 samples (Table 5).

The majority of our samples are from the continental shelf and adjacent banks south of Nova Scotia. Several samples occur on the Northeast Peak of Georges Bank and three samples on the southern New England continental shelf (Fig. 10; Theroux and Wigley footnote 4, table 16).

The main distribution of this species is panarctic and circumpolar with Boreal outposts (Ockelmann 1958); Dance (1974) placed it in the Arctic, Boreal, Aleutian, and Transatlantic provinces.

The boreal astarte is found at depths ranging from 0 to over 2,500 m (Ockelmann 1958; Clarke 1962).

The depth range of our samples is 30 to 95 m with a mean of 74 m. Eighty-nine percent of our samples and 91% of our specimens are in the 50-99 m depth range grouping, the remainder are in the 25-49 m grouping (Table 176).

Astarte borealis appears to prefer coarse grained sediments. Thirty-five percent of our samples occurred in each of two sediment types: gravel and sand-gravel, while 24 and 6%, respectively, occurred in sand and sand-shell sediments. In terms of specimen density, 43% occurred in sand-gravel, 29% in gravel, 24% in sand, and 5% in sand-shell (Table 177). One sample with one specimen was unclassified with regard to sediment type.

***Astarte castanea* (Say 1822). Smooth astarte. Figure 11.**

The smooth astarte is distributed from Arctic seas to Cape Hatteras, N.C. (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

Our samples are from the continental shelf ranging from the Northeast Peak of Georges Bank to slightly north of the mouth of Chesapeake Bay off Maryland; a small group of samples on the Scotian Shelf and at the mouth of the Bay of

[6]Abbot (1974) has "(Say, 1826)" for this species, it should be (Say 1827), see under References.

Fundy also provided specimens (Fig. 11; Theroux and Wigley footnote 4, table 17).

The zoogeographic distribution of this species is Boreal and Virginian (Coomans 1962; Gosner 1971), but Dance (1974) assigned it to the Boreal and Transatlantic provinces.

Depths occupied by *A. castanea* range from 9 to 152 m (Johnson 1934; Abbott 1968).

This common species is well represented in the NEFC collection which contains 458 specimens from 106 samples (Table 5).

Our samples are from depths between 0 and 123 m with a mean of 46 m. Samples and specimens are fairly evenly distributed among three of our depth range groupings (0-24, 25-49, and 50-99 m) which collectively account for nearly 96% of the samples and 99% of the specimens, the balance is in the 100-199 m grouping (Table 178). One sample with one specimen had no information relating to depth.

Samples containing the smooth astarte were absent in till and silt sediments. The majority of samples (65%) and specimens (63%) occurred in sand; sand-gravel yielded 14% of the samples and 24% of the specimens; other sediments in which they occurred (gravel, shell, sand-shell, silty sand, and silt) each contained significantly smaller quantites of both samples and specimens (Table 179). There are 12 samples containing 74 specimens which are unclassified with regard to sediment type.

Astarte crenata subequilatera Sowerby 1854. Lentil astarte. Figure 12.

This species is reported to occur from Arctic seas including Labrador and the Gulf of St. Lawrence to Florida (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Abbott 1968, 1974). It is widely distributed in the Arctic and is considered by Ockelmann (1958), along with its subspecies, to be panarctic and circumpolar.

The lentil astarte is a common bivalve which occurs in 4% of our samples representing nearly 5% of the total number of specimens (Table 5). These values make it the fourth most plentiful in terms of samples and fifth ranked in terms of specimens.

Our samples are concentrated, for the most part, in the more northerly regions of our study area. The majority of samples are in the Gulf of Maine and around the periphery of Georges Bank; others, in diminishing numbers, occupy the continental shelf, slope, and rise in the region of southern New England and off the Middle Atlantic Bight south to off Maryland; no samples occur between Maryland and south of Cape Hatteras, N.C., but reappear on the outer shelf and upper slope between South Carolina and Jacksonville, Fla.; two samples contaning specimens occur off the Florida Keys (Fig. 12; Theroux and Wigley footnote 4, table 18).

The zoogeographic distribution is Arctic,Boreal, Virginian, and Carolinian (Coomans 1962); Gosner (1971) considered it Boreal and Virginian.

The reported depth range of the lentil astarte is 24 to 783 m (Morris 1973; Abbott 1974). This species occurs in shallow water in the northern reaches of its range, but in the southern sectors is found only below 92 m (Abbott 1974). Ockelmann's (1958) reported depth range for Arctic regions is from 4 m at Spitzbergen down to 1,275 m near Jan Mayen.

Our samples range from 23 to 611 m in depth with a mean of 150 m. The majority of both samples and specimens are in the mid to deep (shelf break) continental shelf depth range groupings and in the upper slope grouping (50-99, 100-199, and 200-499 m); fewer samples occur in both shallower and deeper depth range groupings (Table 180).

Moderate amounts of samples occurred in a variety of sediment types: till (22%), sand (18%), silty sand (17%), gravel (14%), clay (13%), and sand-gravel (11%); significantly lower amounts occurred in silt (3%), shell (2%), sand-shell (0.5%). There is a wider disparity among sediment types with regard to number of specimens; 49% of the specimens were in till substrates, 15, 14, and 13% in gravel, sand, and silty sand, respectively, with other sediments containing between 5 and 0.5% (Table 181). There are 42 samples containing 323 specimens which are unclassified with regard to sediment type.

Astarte elliptica (Brown 1827). Elliptical astarte. Figure 13.

This species occurs from Arctic seas near Greenland to Massachusetts and also in Europe (Johnson 1934; La Rocque 1953; Abbott 1974). Ockelmann's (1958) distributional data show it occupying most Arctic regions including Denmark and Great Britain, it also occurs in the west Baltic to Bornholm and in France; he considers it panarctic-boreal only in the North Atlantic.

The elliptical astarte, which is a moderately common bivalve, is represented in our collection by 317 specimens from 42 samples (Table 5).

Our samples are from the periphery of the Gulf of Maine, on the Northeast Peak and Southwest Part of Georges Bank, some are in Cape Cod Bay and a few on the Middle Atlantic Bight continental shelf (Fig. 13; Theroux and Wigley footnote 4, table 19).

The reported depth range for this species is 15 to 165 m (Johnson 1934; La Rocque 1953; Abbott 1974); Ockelmann (1958) reported it from 2 m at East Greenland to 442 m at West Greenland. He further stated that dead shells of this species have been found in the North Atlantic down to 2,465 m.

Our samples range in depth from 23 to 156 m with a mean of 77 m. The majority of samples (76%) and specimens (83%) are in the 50-99 m depth range grouping with lesser amounts in the 0-24, 25-49, and 100-199 m groupings (Table 182).

The relation of this species to bottom sediments contains some disparities depending upon which measure is being considered, 1) number of samples or, 2) number of specimens, occurring in each sediment type. To avoid possible misunderstanding each sediment type will be taken in turn, see Table 183. Gravel contained 13% of the samples and 18% of the specimens; sand-gravel contained the highest proportion of samples (23%), but only yielded 4% of the specimens; till had a fairly even ratio, 19% of the samples and 21% of the specimens; shell with only 10% of the samples yielded the greatest number of specimens (41%) of any bottom type; only 3% of the samples and 0.3% of the specimens occurred in sand-shell; 19% of the samples and 4% of the specimens occurred in sand; silty sand contained 3% of the samples and 3.5% of the specimens; none occurred in silt, but clay contained 10% of the samples and 9% of the specimens. There are 11 samples with 33 specimens which are unclassified with regard to sediment type.

Astarte montagui **(Dillwyn 1817). Montagu's astarte. Figure 13.**

This species occurs in Arctic seas and from Greenland to Massachusetts in the Atlantic; it also ranges from the Bering Sea to British Columbia in the Pacific (Johnson 1934; La Rocque 1953; Morris 1973; Abbott 1974). The distribution in Arctic regions as outlined by Ockelmann (1958) and Tebble (1966) show it occurring very widely throughout the area as well as ranging to the Aleutians, Queen Charlotte Islands, Massachusetts Bay, Denmark, the Western Baltic, and the Bay of Biscay to the south.

This small (12 to 19 mm) member of the genus *Astarte*, considered abundant by Abbott (1974), is represented by only two specimens from one sample in our collection (Table 5).

The sample in our collection is from the Bigelow Bight off the coast of Maine northeast of Portland (Fig. 13; Theroux and Wigley footnote 4, table 20).

Zoogeographic distribution is panarctic-boreal and circumpolar (Ockelmann 1958); Gosner (1971) listed it as Boreal, and Dance (1974) referred to it as occupying the Boreal, Arctic, and Aleutian provinces.

Published records show this species to range from 0 to 445 m in depth (Ockelmann 1958; Abbott 1974).

Our sample is from 79 m depth.

Tebble (1966) listed Montagu's astarte as being found in clean sand, and in muddy and sandy gravel. Our sample is from a till bottom.

Astarte nana **Dall 1886. Southern dwarf astarte. Figure 13.**

The range of this species is from Cape Hatteras, N.C., to Florida, the Gulf States, and the West Indies (Johnson 1934; Abbott 1974).

The southern dwarf astarte is reported to be very abundant especially off eastern Florida (Abbott 1974). The NEFC collection contains 4 samples with a total of 18 specimens (Table 5).

Our samples range from south of Cape Hatteras to slightly south of Miami, Fla. (Fig. 13; Theroux and Wigley footnote 4, table 21).

The published depth range for this species is 11 to 824 m (Johnson 1934; Abbott 1974; Porter 1974).

Our samples range from 248 to 765 m with a mean of 552 m. The 200-499 and 500-999 m depth range groupings each contain 50% of the samples and 33 and 67% of the specimens, respectively (Table 184).

Our samples were found in sand, silty sand, and silt substrates (Table 185).

Astarte quadrans **Gould 1841. Figure 14.**

This species occurs from the Gulf of St. Lawrence to Long Island Sound (Johnson 1934; La Rocque 1953; Abbott 1974); Ockelmann (1958) listed its distribution from Newfoundland to Cape Cod.

The NEFC collection contains 48 specimens of *A. quadrans* from 28 samples (Table 5).

Our samples occur on the Scotian Shelf, in the Gulf of Maine, on outer Georges Bank and on the Middle Atlantic Bight continental shelf south to off Chesapeake Bay (Fig. 14; Theroux and Wigley footnote 4, table 22).

Coomans (1962) listed this species as occupying the Boreal and Virginian provinces, while Gosner (1971) assigned it to Boreal regions.

The published depth distribution of *A. quadrans* ranges from 11 to 73 m (Abbott 1974).

Samples in the NEFC collection range from 22 to 188 m with a mean of 55 m. The majority of our samples and specimens occur in two depth range groupings: 1) 50-99 m, and 2) 25-49 m, the former contains 46 and 56% of the samples and specimens, respectively, and the latter 32 and 23%, respectively, smaller amounts occur in the 0-24 and 100-199 m groupings (Table 186).

The majority of samples (69%) and specimens (80%) of this species occurred in sand sediments, while 19 and 13% of samples and specimens, respectively, occurred in sand-gravel; smaller amounts were obtained in till and sand-shell sediments (Table 187). There are two samples containing two specimens which are unclassified with regard to sediment type.

Astarte smithii **Dall 1886. Smith's astarte. Figure 14.**

Smith's astarte occurs from the Gulf of Mexico to the West Indies and in the Caribbean (Johnson 1934; Clarke 1962; Abbott 1974).

Our collection contains two samples from one sampling site, providing three specimens of *A. smithii* (Table 5).

Our samples are from off the Florida coast southeast of Jacksonville (Fig. 14; Theroux and Wigley footnote 4, table 23).

Depth range for this species according to the above three authors is 99 to 2,869 m. Our samples are from 455 m depth. This depth places it in the 200-499 m depth range grouping.

The substrate at the site of our samples was silt.

Astarte undata **Gould 1841. Waved astarte. Figure 15.**

Widely distributed on the continental shelf and upper continental slope of the northwest Atlantic, it ranges from West Greenland and arctic Canada to cold, deep waters south of Cape Hatteras, N.C. (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Emerson et al. 1976).

"Probably the most common Astarte of New England" (Abbott 1974). The waved astarte occurs in 4.3% of our samples and composes 4.3% of the specimens (Table 5).

Samples in the NEFC collection range from southern Nova Scotia, the Gulf of Maine, Georges Bank, southern New England shelf, Middle Atlantic Bight, to deep water off Chesapeake Bay; three samples occur at the continental shelf break south of Cape Hatteras, N.C. (Fig. 15; Theroux and Wigley footnote 4, table 24).

The waved astarte inhabits the Arctic, Boreal, and Virginian provinces (Coomans 1962); Gosner (1971) listed it as Boreal, and Dance (1974) as Boreal and Transatlantic.

Reported water depths for this species range from below, but near, the tide mark (Abbott 1968) to 190 m (Porter 1974).

Our samples range in depth from 15 to 720 m with a mean depth of 96 m. Fifty-five percent of the samples and 59% of the specimens are from mid-shelf depths (50-99 m). Abundance of samples and specimens outside of this range diminish with increasing and decreasing depth range (Table 188).

Our collections of waved astarte occurred in all sediment types, but most frequently in sand (30% of samples), and till (37% of specimens). They were least frequent in sand-shell, shell, and silt (Table 189).

***Astarte* sp. Figure 16.**

The NEFC collection contains 533 specimens from 94 collections which are classified as *Astarte* sp. (Table 5).

The collections of *Astarte*, without specific determinations, are distributed along the continental shelf to the north of Delaware Bay in a fairly widespread pattern on the Southern New England shelf, on Georges Bank, and into the Gulf of Maine (Fig. 16; Theroux and Wigley footnote 4, table 25).

The depth range for our collections is from 0 to 690 m with a mean of 192 m. A fairly consistent pattern of diminishing sample and specimen density persists from the 50-99 m grouping to the 500-999 m grouping; small quantities occur in the two shallowest groupings (Table 190).

The largest percentages of samples for this genus were found in sand and silty sand substrates which contained 42% and 17%, respectively; gravel, sand-gravel, till, silt, and clay accounted for from 3 to 13% of the samples. One anomaly with regard to the number of specimens occurred in till substrates which contained 16% of the specimens but only 9% of the samples while silty sand areas accounting for 17% of samples yielded 13% of the specimens (Table 191). There are 6 samples containing 18 specimens which are unclassified with regard to sediment type.

Family CRASSATELLIDAE
Genus *Crassinella* Guppy 1874

***Crassinella lunulata* (Conrad 1834). Lunate crassinella. Figure 30.**

The lunate crassinella is reported to occur from Massachusetts to Florida, and from Texas to Brazil; it has also been reported in the West Indies and Bermuda (Johnson 1934; Abbott 1968, 1974; Emerson et al. 1976).

Crassinella lunulata is represented in the NEFC collection by 226 specimens from 87 samples (Table 5).

Our samples are from the southern portion of the study area beginning southeast of the mouth of Chesapeake Bay, on the continental shelf south to Miami, Fla.; however, three samples were obtained in the Vineyard Sound-Nantucket Sound region (Fig. 30; Theroux and Wigley footnote 4, table 47).

This species inhabits the Virginian zoogeographic province (Coomans 1962).

The bathymetric distribution of this species ranges from 1 to 549 m (Abbott 1968; Porter 1974). Our samples are from depths which range from 7 to 135 m with a mean of 29 m. The amounts of both samples and specimens in our collection diminish with increasing depth range. Forty-nine percent of the samples and 54% of the specimens are in the 0-24 m depth range grouping; 40% and 39% respectively, are in the 25-49 m grouping while 6% of the samples and 4% of the specimens are in the 50-99 m depth range grouping; 5 and 4% of samples and specimens, respectively, are in the 100-199 m grouping (Table 192).

This species is reported to occur on gravelly or shelly bottom (Emerson et al. 1976).

The majority of our samples were in sand substrates where 46% of the samples and 47% of the specimens were found. The next highest amounts of both samples and specimens occurred in sand-shell substrates where 37 and 32%, respectively, were found; silty sand substrates yielded 8% of the samples and 14% of the specimens, while gravel and sand-gravel substrates each contained 2% of the samples but the former contained 3% and the latter 1% of the specimens (Table 193).

***Crassinella* sp. Figure 30.**

The NEFC collection contains nine specimens of this taxon from three samples (Table 5).

Our three samples of this taxon are from the continental shelf; one sample is off Cape Hatteras, N.C., and the other two are northeast of Charleston, S.C. (Fig. 30; Theroux and Wigley footnote 4, table 48).

Our samples are from water depths between 7 and 25 m with a mean of 14 m. Two-thirds of the samples are in the 0-24 m depth range grouping and the remaining third in the 25-49 m grouping; 56% of the specimens are in the 0-24 m depth range grouping and 44% in the 25-49 m grouping (Table 194).

The majority of our samples and specimens, 67 and 78%, respectively, occurred in sand while 33% of the samples and 22% of the specimens occurred in sand-shell (Table 195).

Genus *Eucrassatella* Iredale 1924

***Eucrassatella speciosa* (A. Adams 1852). Gibb's clam. Figure 44.**

This species occurs from North Carolina to both sides of Florida and the West Indies and is found elsewhere in the Caribbean (Johnson 1934; Abbott 1968, 1974).

This species is a moderately common to frequent southern form which is represented in our collection by three specimens from two samples (Table 5).

Our samples are from the continental shelf between Cape Fear, N.C., and Charleston, S.C. (Fig. 44; Theroux and Wigley footnote 4, table 73).

This species is a Transatlantic and Carolinian province inhabitant (Dance 1974).

The reported depth range for Gibb's clam is from 4 to 183 m (Johnson 1934; Abbott 1968).

The two samples in the NEFC collection are from 25 and 38 m of water. This depth range places both samples in the 25-49 m depth range grouping.

Our samples were obtained on a sand substrate.

Family CARDIIDAE
Genus *Cerastoderma* Poli 1795

***Cerastoderma pinnulatum* (Conrad 1830). Northern dwarf cockle. Figure 23.**

This species occurs from Labrador to off North Carolina in the Cape Lookout region (Johnson 1934; La Rocque 1953; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Cerastoderma pinnulatum is a common bivalve which occurs in 4.5% of our samples composing 3% of the total number of specimens in our collection (Table 5).

The distribution of our samples is widespread throughout the northern reaches of the study area extending from Nova Scotia and overspreading the entire Gulf of Maine-Georges Bank complex. It ranges onto the Southern New England shelf area and into the Middle Atlantic Bight south to Cape Hatteras, N.C.; one sample occurs on the continental shelf southeast of Charleston, S.C. (Fig. 23; Theroux and Wigley footnote 4, table 36).

This species inhabits the Boreal and Virginian provinces (Coomans 1962; Gosner 1971); Dance (1974) assigned it to the Boreal province in the eastern and western North American sectors and also the Transatlantic province.

The reported depth range for this species is 6 to 260 m (Abbott 1968; Porter 1974).

Our samples range in depth from 0 to 1,865 m with a mean of 95 m. The majority of samples (44%) and 35% of the specimens are in the 50-99 m depth range grouping; distribution of samples on either side of this range grouping decrease with both increasing and decreasing depth range; the largest number of specimens (40%) is in the 0-24 m range grouping (Table 196).

Specimens of the northern dwarf cockle occurred in all sediment types. Largest quantities of samples (44%) and specimens (58%) were found in sand; significantly smaller quantities occurred in each of the other sediment types (Table 197). There are 64 samples containing 1,497 specimens which are unclassified with regard to sediment type.

Genus *Clinocardium* Keen 1936

***Clinocardium ciliatum* (Fabricius 1780). Iceland cockle. Figure 27.**

This species is circumboreal and circumpolar, occurring in both the Atlantic and Pacific Oceans in Arctic and subarctic regions. Published reports list it as occurring from Arctic seas south to Cape Cod in the Atlantic and from the Arctic Ocean to Puget Sound and Japan in the North Pacific (Johnson 1934; Clench and Smith 1944; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974).

The Iceland cockle is a very common Arctic and subarctic bivalve which is especially abundant in offshore waters from Maine northward. There are six specimens of this species from four samples in the NEFC collection (Table 5).

The four samples in the NEFC collection are restricted to the continental shelf in the Gulf of Maine, ranging from nearshore Nova Scotia and along the coast of Maine, south to Cape Cod, Mass. (Fig. 27; Theroux and Wigley footnote 4, table 42).

The zoogeographic distribution of this species is Arctic (Ockelmann 1958).

Reported depth range for this species is from 6 to 183 m in Atlantic waters (Abbott 1968, 1974; Gosner 1971; Morris 1973). Ockelman (1958), in his study of Arctic regions, reported it as ranging from 2 to 677 m. He further stated that dead shells are commonly found in the Norwegian Sea down to 2,465 m.

Our samples range from 51 to 114 m in depth with a mean of 79 m. Seventy-five percent of the samples and 83% of the specimens are in the 50-99 m depth range grouping, while 25% of samples and 17% of specimens are in the 100-199 m depth range grouping (Table 198).

Our samples were found in three sediment types. One-third of the samples and 25% of the specimens occurred in gravel; 33% of the samples and 50% of the specimens occurred in till; the remaining 33% of samples occurred in clay which contained 25% of the specimens (Table 199). One sample which contained two specimens is unclassified with regard to sediment type.

Genus *Laevicardium* Swainson 1840

***Laevicardium mortoni* (Conrad 1830). Morton's egg cockle. Figure 50.**

This species is distributed from Nova Scotia to Florida, and ranges into the Gulf of Mexico to Texas and south to Brazil and Guatemala (Johnson 1934; Clench and Smith 1944; Morris 1951, 1973; La Rocque 1953; Abbott 1968, 1974; Emerson et al. 1976). Ockelmann (1958) reported it from Newfoundland to Cape Cod, Mass.

This small cockle, which is especially common in the Southern New England area, is represented by 104 specimens from 47 samples in the NEFC collection (Table 5).

The samples in the NEFC collection occur in two distinct groupings, one of which is in the Cape Cod region and the other beginning south of Cape Hatteras, N.C., on the continental shelf, extending south to slightly below Jacksonville, Fla. (Fig. 50; Theroux and Wigley footnote 4, table 82).

The zoogeographic distribution of Morton's egg cockle, according to Coomans (1962), is Virginian, Caribbean, and Celtic; Gosner (1971) placed it in the Virginian province.

Morton's egg cockle commonly occurs from the low tide zone to 8 m depth (Abbott 1968; Porter 1974).

Our samples are from 0 to 50 m depth with a mean of 9 m. Forty-nine percent of the samples and 57% of the specimens are in the 0-24 m depth range grouping, 47% of the samples and 39% of the specimens are in the 25-49 m grouping, and only 4% of the samples and 4% of the specimens are in the deeper water, 50-99m, depth range grouping (Table 200).

This species occupies muddy bottoms (Emerson et al. 1976).

The NEFC samples were obtained in four sediment types. The majority of the samples (56%) and specimens (59%) occurred in sand substrates with next greatest quantities, 33% for samples and 28% for specimens, occurring in sand-shell; silty sand substrates contained 6% of the samples and 9% of the specimens, while sand-gravel substrates contained 6 and 4%, respectively (Table 201). There are 11 samples containing 28 specimens which are unclassified with regard to sediment type.

Genus *Nemocardium* Meek 1876

***Nemocardium peramabile* (Dall 1881). Eastern microcockle. Figure 70.**

The eastern microcockle occurs from Rhode Island to the Gulf of Mexico, and the West Indies on to Brazil (Johnson 1934; Morris 1973; Abbott 1974).

Nemocardium peramabile, which is very commonly dredged off eastern Florida (Abbott 1974), is represented in our collection by only two specimens from one sample (Table 5).

The single sample containing this species in our collection is from off Key West, Fla. (Fig. 70, Theroux and Wigley footnote 4, table 121).

Coomans (1962) listed this species from the Virginian, Carolinian, and Caribbean zoogeographical provinces.

The depth range for this species is 33 to 641 m (Abbott 1974).

Our sample is from a depth of 220 m. This depth places it in the 200-499 m depth range grouping. The sample was obtained from a silty sand substratum.

Genus *Papyridea* Swainson 1840

***Papyridea semisulcata* (Gray 1825). Frilled paper cockle. Figure 84.**

The frilled paper cockle occurs at Bermuda and is also distributed from southern Florida to Brazil (Johnson 1934; Abbott 1974).

Papyridea semisulcata is an uncommon warm water bivalve of which there are three specimens from two samples in our collection (Table 5).

The two samples in the NEFC collection are from the continental shelf north of Miami, Fla. (Fig. 84; Theroux and Wigley footnote 4, table 143).

According to Abbott (1974), depths at which this species may be found range from low tide line to approximately 73 m.

Our samples are from 28 and 36 m of water. This depth range places both samples and their three specimens in the 25-49 m depth range grouping.

Our samples were obtained in a sand substratum.

Family MACTRIDAE
Genus *Mulinia* Gray 1837

***Mulinia lateralis* (Say 1822). Dwarf surf clam. Figure 63.**

The dwarf surf clam is distributed from the Gulf of St. Lawrence to northern Florida, it extends into Texas, and is also present in the West Indies (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1974; Emerson et al. 1976).

This is a very abundant east coast bivalve species of which there are 897 specimens from 51 samples in the NEFC collection (Table 5).

Our samples are primarily from inshore waters; however, there are two offshore samples on the continental shelf, one on Georges Bank and one off Chesapeake Bay; the range of the inshore samples is from slightly off the coast of Maine south along the Cape Cod region into Long Island Sound, and to Pamlico Sound and Cape Hatteras, N.C. (Fig. 63; Theroux and Wigley footnote 4, table 110).

The dwarf surf clam inhabits the Boreal, Virginian, and Carolinian zoogeographic provinces (Coomans 1962); Gosner (1971) placed it only in the Boreal and Virginian provinces.

This species is a shallow water inhabitant with a depth range extending from +1 to 28 m (Abbott 1974; Porter 1974).

Our samples range from 0 to 55 m with a mean of 13 m. The majority of our samples are in the 0-24 m depth range grouping which contains 84% of the samples and 98% of the specimens; the 25-49 m grouping contains 14% of the samples, and 2% of the specimens, while the 50-99 m grouping contains 2% of the samples, and < 0.1% of the specimens (Table 202).

Abbott (1974) reported that the dwarf surf clam is normally found in sand sediments.

Among our samples 30% were found in sand which contained 24% of the specimens; however, the majority of the specimens (52%) came from silt substrates which contained 11% of the samples; silty sand contained 30% of the samples and 8% of the specimens; clay contained 24% of the samples and 16% of the specimens; sand-gravel and sand-shell contained significantly smaller amounts of each (Table 203). There are 14 samples containing 143 specimens which are unclassified with regard to sediment type.

***Mulinia* sp. Figure 63.**

The NEFC collection contains two specimens from one sample of this genus (Table 5).

The sample is from the continental shelf south and east of Nantucket Shoals (Fig. 63; Theroux and Wigley footnote 4, table 111), from a water depth of 84 m, in sand.

Genus *Rangia* DesMoulins 1832

***Rangia cuneata* (Sowerby 1832). Common rangia. Figure 96.**

The common rangia is normally found from northern Chesapeake Bay to Texas and Mexico (Johnson 1934; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Rangia cuneata is a locally very abundant to common bivalve which inhabits coastal areas and freshwater to brackish marshes. Our collection contains nine specimens of this species from four samples (Table 5).

Our samples are from Pamlico Sound, N.C. (Fig. 96; Theroux and Wigley footnote 4, table 170).

This bivalve is a shallow water inhabitant occupying water depths between 1 and 4 m according to Porter (1974).

Our samples are from water depths which range between 4 and 6 m with a mean of 5 m. This depth range places it in the 0-24 m depth range grouping.

The NEFC samples containing this species were obtained in clay sediments.

Genus *Spisula* Gray 1837

***Spisula polynyma* (Stimpson, W. 1860). Stimpson's surf clam. Figure 100.**

Stimpson's surf clam is found in both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Arctic seas to Rhode Island and in the Pacific from Arctic seas to Puget Sound and is also found at Japan (Johnson 1934; La Rocque 1953; Ockelmann 1958; Morris 1973; Abbott 1974, Emerson et al. 1976). Chamberlin and Stearns (1963) have extended the southern reaches of the range of Stimpson's surf clam to Hudson Canyon.

The NEFC Specimen Reference Collection contains 14 specimens from 2 samples of this species (Table 5).

Our two samples are from off the tip of Cape Cod, Mass., at Provincetown (Fig. 100; Theroux and Wigley footnote 4, table 179).

Morris (1973), Abbott (1974), and Emerson et al. (1976) stated that this moderately common species, which is plentiful at Eastport and other coastal areas in Maine, ranges in depth from the low tide line to approximately 110 m.

The NEFC samples are from water depths of 38 and 42 m which places them in the 25-49 m depth range grouping.

Chamberlin and Stearns (1963) reported that Stimpson's surf clam is normally found in medium sediments of sand, gravel, and mixtures of sand gravel. Unfortunately, there was no sediment information contained in the sampling data of the samples from which we obtained our specimens.

***Spisula solidissima* (Dillwyn 1817). Atlantic surf clam. Figure 101.**

Spisula solidissima is one of the most economically important shellfish resources of the U.S. east coast. Landings in 1977 were 51.0 million pounds of meats valued at $26.4 million, in 1978 landings decreased to 39.2 million pounds of meat with a value of $20.9 million (Pileggi and Thompson 1979). As such, it is, and has been, the subject of intensive studies by various elements of the old Bureau of Commercial Fisheries and presently the NEFC of the NMFS. As with other commercially important bivalve species, the NEFC possesses a broad data base on this species; however, the data herein presented are based solely on the collections which physically reside in the Specimen Reference Collection at the NEFC.

This species is known by a variety of common names in addition to that which appears above: surf clam; hen clam; sea clam; bar clam; skimmer; dipper clam; beach clam; and giant clam, and is extremely important in some areas, especially in the inshore and near offshore waters of coastal New Jersey between Sandy Hook and Cape May.

The Atlantic surf clam is normally found in some outlying areas of the Arctic but principally from the Gulf of St. Lawrence to Cape Hatteras, N.C. (Johnson 1934; Morris 1951, 1973: La Rocque 1953; Ockelman 1958; Abbott 1968, 1974; Yancey and Welch 1968; Emerson et al. 1976).

The NEFC collection has on hand 764 specimens from 166 samples (Table 5).

The NEFC samples are from the continental shelf ranging from the Nova Scotian shelf and Browns Bank, the inshore regions of the Gulf of Maine and the Cape Cod region out onto Georges Bank and south to approximately Jacksonville, Fla. (Fig. 101; Theroux and Wigley footnote 4, table 180).

This species inhabits the Boreal, Virginian, and Carolinian provinces in the northwest Atlantic; the genus and family are Celtic in Europe which harbors another species, *Spisula solida* (Coomans 1962); Gosner (1971) placed it in the Boreal and Virginian provinces, while Dance (1974) stated it occupies the Boreal and Transatlantic zoogeographic provinces.

Although the Atlantic surf clam primarily inhabits inshore, shallow waters, it does range out to 146 m depth (Abbott 1968, 1974; Yancey and Welch 1968).

The depth range of our samples is 0 to 110 m with a mean of 33 m. In terms of depth range groupings, the majority of both samples and specimens are in the shallowest, 0-24 m grouping, which contains 42% of the samples and 67% of the specimens; the 25-49 m grouping contains 40% of the samples and 27% of the specimens; the 50-99 m grouping, 17% of the samples and 6% of the specimens; only 2% of the samples and 0.4% of the specimens are in the 100-199 m grouping (Table 204). There are 2 samples containing 21 specimens which do not contain depth information in their sampling data.

Morris (1951) and Yancey and Welch (1968) reported that this species is normally found in sand and gravel substrates.

Our samples were found in nearly all substrate types considered in this report, the only exceptions were till and clay. The major sediment type was sand which contained 69% of the samples and 82% of the specimens; next greatest abundance of both samples and specimens occurred in sand-shell substrates which contained 12% of the samples and 10% of the specimens; gravel, sand-gravel, shell, silty sand, and silt substrates, although containing samples which yielded specimens of *Spisula solidissima*, contained significantly smaller amounts of both samples and specimens (Table 205). There are 40 samples containing 96 specimens which are unclassified with regard to sediment type.

Family MESODESMATIDAE
Genus *Ervilia* Turton 1822

***Ervilia concentrica* (Holmes 1860). Concentric ervilia. Figure 44.**

The concentric ervilia is a southern species occurring from North Carolina to both sides of Florida and to Brazil, it is also found at Bermuda (Johnson 1934; Abbott 1974).

Ervilia concentrica is a common warm water species of which there are 192 specimens from 112 samples in our collection (Table 5).

Our samples range from just north of Cape Hatteras, N.C., to the southern two-thirds of Florida (Fig. 44; Theroux and Wigley footnote 4, table 72).

Abbott (1974) and Porter (1974) reported a bathymetric range for this species which extends from 0.3 to 92 m in depth.

Our samples are from water depths which range from 6 to 50 m with a mean of 24 m. Three depth range groupings are occupied with diminishing abundance as depth range increases. The 0-24 m depth range grouping contains 54% of the samples and 55% of the specimens; the 25-49 m grouping contains 45% of the samples and 44% of the specimens, while the 50-99 m grouping contains 2% of the samples and < 1% of the specimens (Table 206).

Sand substrates were decidedly preferred over other types of sediments, accounting for 63% of the samples and 61% of the specimens. Next preferred sediment type, sand-shell, contained 28% of the samples and 30% of the specimens. Gravel, sand-gravel, silty sand, and silt substrates contained between 1 and 4% of the samples, and 0.3 to 3% of the specimens (Table 207).

Genus *Mesodesma* Deshayes 1831

***Mesodesma arctatum* (Conrad 1830). Arctic wedge clam. Figure 61.**

This species ranges from Greenland to Chesapeake Bay and Virginia (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

There are 52 specimens from 2 samples of Arctic wedge clams in the NEFC collection (Table 5).

Our samples are from the edge of the continental shelf off the eastern tip of Long Island, N.Y. (Fig. 61; Theroux and Wigley footnote 4, table 107).

The Arctic wedge clam occupies the Arctic, Boreal, and Virginian zoogeographic provinces (Coomans 1962); Gosner (1971) placed it only in the Boreal province, while Dance (1974) placed it in the Arctic, Boreal, and Transatlantic provinces.

Depths occupied by this species range from low water to approximately 92 m (Abbott 1968, 1974).

Our two samples are from 93 and 99 m water depths. This depth range places both samples in the 50-99 m depth range grouping (Table 208).

Morris (1951), Abbott (1968), and Emerson et al. (1976) reported that this species is normally found in sand substrates.

Our samples occurred in silty sand which contained 50% of the samples and 4% of the specimens, and clay with 50% of the samples and 96% of the specimens (Table 209).

Family SOLENIDAE

The NEFC Specimen Reference Collection contains 39 specimens of bivalves from 11 samples which were classified only to the familial level of Solenidae (Table 5).

One sample containing members of this family is from east of Nantucket Shoals in the Great South Channel area, another from the continental shelf off the entrance to Delaware Bay, the remainder are from around Cape Hatteras, N.C., extending from the mouth of Chesapeake Bay to south of Cape Fear, N.C. (Fig. 102; Theroux and Wigley footnote 4, table 181).

Samples containing members of the family Solenidae range in depth from 13 to 53 m with a mean of 26 m. The majority of these samples are in the 0-24 m depth range grouping which contains 64% of the samples and 36% of the specimens, while the 25-49 m grouping contains 27% of the samples and 26% of the specimens; the 50-99 m grouping contains the smallest amount of samples, 9%, but the greatest number of specimens, 39% (Table 210).

Samples containing members of the family Solenidae were found in four different sediment types: gravel, sand-shell, sand, and silty sand. Sand sediments contained the majority of both samples and specimens, 50% for the former and 63% for the latter; sand-shell substrates contained 30% of the samples and 21% of the specimens; silty sand contained 10% of the samples and 13% of the specimens, while gravel substrates contained 10% of the samples and 4% of the specimens (Table 211). There is 1 sample containing 15 specimens which is unclassified with regard to sediment type.

Genus *Ensis* Schumacher 1817

***Ensis directus* (Conrad 1843). Atlantic jackknife clam. Figure 43.**

This species is distributed from the Gulf of St. Lawrence and Newfoundland, along the whole U.S. Atlantic coast, south to Florida (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974).

Ensis directus is a very common bivalve of the northwest Atlantic whose commonness is reflected in our Specimen Reference Collection which contains 2,150 specimens from 206 samples, each accounting for 2% of their respective category for the entire sampling suite (Table 5).

Our samples are distributed from the Northeast Peak of Georges Bank ranging along the entire continental shelf south to just north of Miami, Fla. (Fig. 43; Theroux and Wigley footnote 4, table 71).

This species inhabits the Boreal, Virginian, and Carolinian zoogeographic provinces (Coomans 1962); Gosner (1971) placed it in the Boreal and Virginian provinces, while Dance (1974) placed it in the Boreal, in east North America, and the Transatlantic provinces.

This species bathymetric habits are principally littoral and intertidal but does extend down to approximately 37 m in depth (Morris 1973; Porter 1974).

Our samples are from depths which range between 1 and 100 m with a mean of 31 m. The majority of samples are in the shallowest depth range grouping 0-24 m which contains 45% of the samples and 67% of the specimens; there is a gradual decline in abundance with increasing depth range with 38% of the samples and 30% of the specimens occurring in the 25-49 m depth range grouping; 17 and 3%, respectively, in the 50-99 m grouping and traces occurring in the 100-199 m grouping (Table 212).

The Atlantic jackknife clam is commonly found on sandy mud or sand bottom near the low water mark (Abbott 1968, 1974).

In our collection 70% of the samples and 60% of the specimens occurred in sand, 20% of the samples and 13% of the specimens occurred in sand-shell, and between 1 and 3% of the samples and < 1 to 2% of the specimens occurred in gravel, sand-gravel, shell, silty sand, and silt substrates (Table 213). There are 12 samples containing 37 specimens which are unclassified with regard to sediment type.

Genus *Siliqua* Megerle 1811

***Siliqua costata* Say 1822. Atlantic razor clam. Figure 99.**

The Atlantic razor clam is distributed from eastern portions of Canada, the Gulf of St. Lawrence, and Newfoundland south to North Carolina (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973, Emerson et al. 1976).

Siliqua costata is a common northwestern Atlantic bivalve, the NEFC Specimen Reference Collection contains 104 specimens of this species from 32 samples (Table 5).

The NEFC samples are primarily from the Georges Bank region with a few inshore collections in the New England region (Fig. 99; Theroux and Wigley footnote 4, table 176).

Coomans (1962) and Gosner (1971) reported this species an an inhabitant of the Boreal and Virginian provinces, while Dance (1974) listed it as occupying the Arctic and Boreal provinces in eastern North America as well as the Transatlantic province.

This species is primarily a shallow water inhabitant but does range out to approximately 29 m depth (Abbott 1974; Porter 1974).

Our samples are from water depths which range between 8 and 260 m with a mean of 55 m. The majority of the samples occurred in mid-shelf depths and shallower. In terms of depth range groupings, 47% of the samples and 39% of the specimens are in the 50-99 m depth range grouping, while 31% of

the samples and 41% of the specimens are in the 25-49 m grouping; the 0-24 m grouping contains 16% of the samples and 12% of the specimens; two other depth range groupings which contain samples and specimens of this species are the 100-199 m and the 200-499 m groupings each of which contain 3% of the samples and 7 and 1%, respectively, of the specimens (Table 214).

Abbott (1968, 1974), Morris (1973), and Emerson et al. (1976) all stated that this species is an inhabitant of mud and sand bottoms.

The majority of our samples (97%), and specimens (97%), occurred in sand substrates with silty sand containing 3% for each (Table 215). There are two samples containing eight specimens which are unclassified with regard to sediment type.

Family TELLINIDAE

The NEFC collection contains 67 specimens from 26 samples which are identified to the taxonomic level of family Tellinidae (Table 5).

Samples containing this taxon are sparsely distributed along the east coast continental shelf from New York to Miami, Fla. (Fig. 106; Theroux and Wigley footnote 4, table 190).

The depth distribution of samples containing members of the Tellinidae ranges between 4 and 112 m with a mean of 28 m. The majority of both samples and specimens are in the 0-24 m depth range grouping, which contains 65% of the samples and 73% of the specimens; the 25-49 m and 50-99 m groupings each contain 15% of the samples while the former contains 8% and the latter 18% of the specimens; only one other depth range grouping contains members of this taxon, the 100-199 m grouping with 4% of the samples and 2% of the specimens (Table 216).

No samples containing members of this taxon occurred in sand-gravel, till, or clay sediments; however, sand and sand-shell substrates contained 46 and 31% of the samples, and 48 and 30% of the specimens, respectively; shell and silty sand substrates each contained 8% of the samples and 3 and 16%, respectively, for specimens; gravel and silt substrates each contained 4% of the samples and 2% of the specimens (Table 217).

Genus *Macoma* Leach 1819

Macoma balthica (Linné 1758). Baltic macoma. Figure 58.

The Baltic macoma is widely distributed throughout the northern reaches of the Atlantic and Pacific Oceans. In the Atlantic it extends from Arctic seas to Georgia while in the Pacific from Arctic seas to San Diego, Calif., and Japan; it also occurs in northern Europe where it is very common in Norway and Sweden extending south to the Iberian Peninsula (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Emerson et al. 1976).

This common and abundant bivalve of northern seas is represented by 783 specimens from 45 samples in our collection (Table 5).

The NEFC suite of samples ranges from the Scotian Shelf, south through the Gulf of Maine onto the Middle Atlantic Bight continental shelf to Charleston, S.C. (Fig. 58; Theroux and Wigley footnote 4, table 101).

La Rocque (1953) considered this species to be circumboreal; Coomans (1962) placed it in the Arctic, Boreal, Virginian, and Caribbean zoogeographic provinces and mentioned that the species, genus, and family are Celtic in Europe; Dance (1974) placed it in the Boreal, Mediterranean (on the Atlantic Coast), Aleutian, and Californian provinces.

The bathymetric range of this species extends from the intertidal zone to deep water (Johnson 1934; Abbott 1974).

Our samples are from depths ranging between 1 and 403 m of water with a mean of 75 m. The shallowest, the 0-24 m, depth range grouping contains the largest number of samples (42%) as well as specimens (77%); the next grouping containing significant amounts of both samples and specimens is the 50-99 m grouping with 24 and 16%, respectively. The 100-199 m grouping contains 18% of the samples but only 3% of the specimens, while the 25-49 m grouping and the 200-499 m grouping contain 9 and 7%, respectively, for samples, and 4 and 0.4%, respectively, for specimens (Table 218).

The only sediment type in which no *Macoma balthica* were encountered was shell. The greatest number of samples (32%) occurred in silty sand while the largest number of specimens occurred in sand (47%); sand contained only 23% of the samples and silty sand 14% of the specimens. The finer substrates, from silty sand through clay, contained larger amounts in terms of both samples and specimens than the coarser grained sediments (Table 219). One sample containing one specimen is unclassified with regard to sediment type.

Macoma calcarea (Gmelin 1791). Chalky macoma. Figure 59.

The chalky macoma is widely distributed throughout northern Atlantic and Pacific waters. In the Atlantic it ranges from Arctic seas to Long Island, N.Y., and in the Pacific from Arctic seas to California and Japan; it is also widely distributed throughout Arctic regions (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Abbott 1968, 1974).

This common cold water species is represented in our collection by 542 specimens from 75 samples (Table 5).

Our samples range from the Scotian Shelf down to the outer shores of Long Island, N.Y. (Fig. 59; Theroux and Wigley, footnote 4, table 102).

La Rocque (1953) listed the chalky macoma as circumpolar; Coomans (1962) listed it as occupying the Arctic, Boreal, and Virginian provinces; Gosner (1971) placed this species only in the Boreal province, while Dance (1974) considered it to inhabit the Arctic, Aleutian, Transatlantic, Californian, and Japonic provinces; Ockelmann's (1958) view is that the chalky macoma is panarctic, and that it is circumpolar with Boreal outposts.

This species enjoys a wide bathymetric range occupying water depths which range from +1 to 2,297 m (Clark 1962; Abbott 1968).

Our samples are from water depths that range from 1 to 720 m with a mean of 136 m. Thirty-one percent of the samples and 26% of the specimens are in the 50-99 m depth range grouping, while the 100-199 m grouping contains 25% of the samples and 27% of the specimens. Amount of both samples and specimens decreases in the depth range groupings on either side of the mid and lower shelf groupings outlined above (Table 220).

Sand and silty sand substrates contained the largest amounts of both samples, 24 and 29% respectively, and specimens, 44 and 36% respectively. Other sediment types contained significantly smaller quantities with the exception of shell and sand-shell sediments from which they were absent (Table 221). There are five samples containing eight specimens which are unclassified with regard to sediment type.

***Macoma tenta* (Say 1834). Tenta macoma. Figure 59.**

The tenta macoma is distributed throughout the northwest Atlantic ranging from Newfoundland to Florida; it also occurs at Bermuda, in the Gulf of Mexico, the West Indies, and ranges south to Brazil (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

Macoma tenta is a very common bivalve species of which we have 708 specimens from 22 samples (Table 5).

Our samples occur in the New England region. They are located in the environs of Cape Cod, Mass., and the outer islands, on the outer continental shelf of Georges Bank, and the Gulf of Maine (Fig. 59; Theroux and Wigley footnote 4, table 103).

The main distribution of this species is Virginian, Carolinian, and Caribbean in the Western Atlantic; the genus and family are Celtic in Europe (Coomans 1962); Gosner (1971) considered it to be Boreal and Virginian in distribution.

The tenta macoma is essentially an inshore, shallow water dweller with a depth preference ranging between 0.3 and 31 m (Abbott 1968, 1974; Porter 1974).

Our samples range in depth between 1 and 73 m with a mean of 24 m. The majority of samples and specimens are in the shallowest, 0-24 m, depth range grouping which contains 68% of the samples and 98% of the specimens; the 25-49 m grouping contains 14% of the samples and 0.6% of the specimens while the 50-99 m grouping contains 18% of the samples and 2% of the specimens (Table 222).

Abbott (1968, 1974), and Emerson et al. (1976) reported that this species is normally found in sand or muddy substrates.

The majority of our samples (46%) occurred in sand; the largest number of specimens (73%) occurred in clay. Sand-gravel substrates contained 18% of the samples and 8% of the specimens; sand contained 16% of the specimens; silty sand substrates contained 9% of the samples and 3% of the specimens, and clay contained 27% of the samples (Table 223). There are 11 samples containing 671 specimens which are unclassified with regard to sediment type.

***Macoma* sp. Figure 60.**

There are 12 specimens from 10 samples in the NEFC collection which bear the designation *Macoma* sp. (Table 5).

Our samples containing members of this genus are from two of the primary fishing banks in the area, Browns Bank and Georges Bank, and also from coastal waters of Massachusetts and off Long Island, N.Y. (Fig. 60; Theroux and Wigley footnote 4, table 104).

The NEFC samples are from water depths ranging from 1 to 103 m with a mean depth of 48 m. Thirty percent of the samples are in the 0-24 m and the 25-49 m depth range groupings which contain 25 and 33% of the specimens, respectively; 20% of the samples occur in each of the 50-99 m and 100-199 m groupings which contain 25 and 17% of the specimens, respectively (Table 224).

Fifty percent of the samples and specimens occurred in sand substrates with 25% of the samples and 30% of the specimens occurring in silt substrates; the coarse grained fractions, gravel and sand-gravel, each contained 13% of the samples and 10% of the specimens (Table 225). There are two samples containing two specimens which are unclassified with regard to sediment type.

Genus *Strigilla* Turton 1822

***Strigilla mirabilis* (Philippi 1841). White strigilla. Figure 102.**

This southern species, which occurs in Bermuda, is also found from Cape Hatteras, N.C., extending around the Florida Peninsula, into the Gulf of Mexico, where it extends from Texas to the Yucatan in Mexico; it has also been reported from Brazil (Johnson 1934; Boss 1969; Morris 1973; Abbott 1974; Emerson et al. 1976).

The white strigilla is represented in the NEFC collection by 12 specimens from 9 samples (Table 5).

The samples in the NEFC collection are from the continental shelf between Cape Fear, N.C., and Jacksonville, Fla. (Fig. 102; Theroux and Wigley footnote 4, table 183).

This species normally ranges in depth from just offshore at +1 to 57 m (Abbott 1968, 1974).

Our samples range in depth from 6 to 30 m with a mean of 17 m. The 0-24 m depth range grouping contains 67% of the samples and 75% of the specimens and the 25-49 grouping contains 33% of the samples and 25% of the specimens (Table 226).

Samples containing the white strigilla were obtained from areas containing sand and sand-shell substrates. The former contained 67% of the samples and 75% of the specimens, while the latter contained 33% of the samples and 25% of the specimens (Table 227).

Genus *Tellina* Linné 1758

***Tellina aequistriata* Say 1824. Striated tellin. Figure 103.**

The distribution of this species is from North Carolina to Texas and Brazil; it also occurs in the West Indies (Johnson 1934; Boss 1966; Abbott 1968, 1974; Andrews 1971; Morris 1973).

The NEFC collection contains one specimen from one sample of this species (Table 5).

Our sample comes from inshore waters south of Cape Fear, N.C. (Fig. 103; Theroux and Wigley footnote 4, table 185).

The depth range for the striated tellin is 2 to 64 m (Boss 1966; Abbott 1968).

The NEFC sample is from a water depth of 20 m; this depth places it in the 0-24 m depth range grouping.

Both Boss (1966) and Andrews (1971) reported that this species is normally found on sandy bottoms. Our sample was also obtained from a sand substratum.

***Tellina agilis* Stimpson 1858.[7] Northern dwarf tellin. Figure 103.**

This common bivalve occurs from the Gulf of St. Lawrence to Georgia (Abbott 1968, 1974; Boss 1968; Morris 1973; Emerson et al. 1976).

[7]Abbott (1974) has "Stimpson, 1857" for this species, it should be Stimpson 1858, see under References.

Tellina agilis is represented in the NEFC Specimen Reference Collection by 1,131 specimens, representing 1% of the total number of specimens, from 114 samples which also represent 1% of the total number of samples (Table 5).

The NEFC samples are distributed from Georges Bank and the Cape Cod region along the continental shelf into the Middle Atlantic Bight region south to the environs of Cape Hatteras, N.C.; there is also one sample in the mid-section of the Florida Peninsula (Fig. 103; Theroux and Wigley footnote 4, table 186).

Gosner (1971) stated that this species is Boreal and Virginian in distribution while Dance (1974) placed it in the Boreal as well as the Transatlantic province.

The range of water depth occupied by this species is from 0 to 120 m (Porter 1974).

Our samples are from water depths which range between 1 and 146 m with a mean of 22 m. The majority of both samples and specimens are in the shallowest depth range grouping, 0-24 m, which contains 69% of the samples and 91% of the specimens; the 25-49 m grouping which contains 27% of the samples and 9% of the specimens, while the 50-99 m grouping contains 3% of the samples and 0.5% of the specimens; the 100-199 m grouping contains 2% of the samples and 0.5% of the specimens (Table 228). There are 2 samples containing 12 specimens which do not contain any depth information.

Abbott (1968) reported that this species is normally found in sandy-mud bottoms.

Our samples occurred in all sediment types but in varying proportions. The majority of both samples and specimens occurred in sand substrates which contained 72% of the samples and 92% of the specimens; next largest amounts of samples and specimens occurred in silty sand containing 11% of the samples and 3% of the specimens; there were significantly lower amounts in gravel, sand-gravel, shell, sand-shell, silt, and clay substrates (Table 229). There are 13 samples containing 56 specimens which are unclassified with regard to sediment type.

***Tellina consobrina* Orbigny 1842. Consorbine tellin. Figure 104.**

The distributional range for this species is southeast Florida to the Lesser Antilles and Tobago, it also occurs at Bermuda (Boss 1968; Abbott 1974).

This small tellin is uncommon and is represented in the NEFC collection by 20 specimens from 7 samples (Table 5).

One of our samples is from Cape Fear, N.C., the majority, however, are between Charleston, S.C., and the mid-section of the Florida Peninsula below Jacksonville (Fig. 104; Theroux and Wigley footnote 4, table 187).

The consobrine tellin occupies offshore waters down to approximately 128 m (Abbott 1974).

Our samples occupy water depths which range between 8 and 16 m with a mean of 11 m. This depth range places them in the 0-24 m depth range grouping.

Sediment types in which our samples were found were sand and sand-shell; the former contained 57% of the samples and 65% of the specimens, while the latter contained 43% of the samples and 35% of the specimens.

***Tellina versicolor* DeKay 1843. DeKay's dwarf tellin. Figure 105.**

DeKay's dwarf tellin occurs from Cape Cod to Trinidad in the West Indies and in the Gulf of Mexico, on the west coast of Florida to west Texas (Abbott 1968, 1974; Andrews 1971; Morris 1973; Porter 1974; Emerson et al. 1976).

This is a common northwest Atlantic tellin of which there are 297 specimens from 58 samples in our collection (Table 5).

The NEFC samples are distributed from Atlantic City, N.J., to north of Miami, Fla., on the continental shelf (Fig. 105; Theroux and Wigley footnote 4, table 188).

The zoogeographic distribution of this species is Virginian, Carolinian, and Caribbean (Coomans 1962); Gosner (1971) placed it in the Virginian province.

The depth distribution for this fairly common species is from 2 to 92 m (Johnson 1934; Abbott 1968, 1974).

Our samples are from water depths which range between 6 and 65 m with a mean of 23 m. The majority of both samples and specimens are in the shallowest, 0-24 m depth range grouping which contains 64% of the samples and 87% of the specimens; the 25-49 m grouping contains 33% of the samples and 13% of the specimens, while the 50-99 m grouping contains 3% of the samples and 1% of the specimens (Table 230).

Both Abbott (1968) and Andrews (1971) reported this species occupies sand substrates.

This sand preference is also apparent in our samples with 67% of the samples and 68% of the specimens occuring in this sediment type, while sand-shell substrates contained 29% of the samples and 31% of the specimens; gravel and silty sand substrates each contained 2% of the samples and 0.3 and 0.7%, respectively, of the specimens (Table 231).

***Tellina* sp. Figure 106.**

There are 151 specimens from 70 samples in the NEFC collection which are classified to the level of genus *Tellina* (Table 5).

Samples containing this genus are from the mouth of the Bay of Fundy in the Gulf of Maine, and on Georges Bank, and also range from Cape Cod, Mass., to Miami and the Florida Keys (Fig. 106; Theroux and Wigley footnote 4, table 189).

Our samples are from water depths which range between 0 and 146 m with a mean of 37 m. The majority of both samples and specimens are in the 0-24 m depth range grouping which contains 44% of the samples and 53% of the specimens; there is a gradual diminution in abundance with increasing depth range; the 25-49 m grouping contains 39% of the samples and 34% of the specimens; the 50-99 m grouping contains 11% of the samples and 11% of the specimens, while the 100-199 m grouping contains 6% of the samples and 3% of the specimens (Table 232).

No samples containing members of the genus *Tellina* were found in gravel, sand-gravel, or till sediments, but were found in all the other sediment types considered in this report. The majority of samples (68%) and specimens (71%) occurred in sand, while sand-shell substrates contained 19% of the samples and 18% of the specimens; all other sediment types in which they were found, shell, silty sand, silt, and clay, contained 6% or less of both samples and specimens (Table 233). There are two samples containing nine specimens which are unclassified with regard to sediment type.

Family DONACIDAE
Genus *Donax* Linné 1758

***Donax* sp. Figure 42.**

There are two specimens from one sample of the genus *Donax* in the NEFC specimen collection (Table 5).

The one sample in our collection is from nearshore waters along the outer banks between Cape Hatteras and Cape Fear, N.C. (Fig. 42; Theroux and Wigley footnote 4, table 70).

Our sample is from 18 m of water placing it in the 0-24 m depth range grouping.

The substrate at the sampling site containing the two specimens of wedge shells was sand.

Family SEMELIDAE
Genus *Abra* Lamarck 1818

***Abra* sp. Figure 3.**

Although there are several Atlantic species of this genus none have as yet been identified in the NEFC Specimen Reference Collection due to smallness of size or damage to shells. Members of *Abra* sp. occur in 60 samples yielding 125 specimens (Table 5).

The distribution of our samples of this genus ranges from the entrance of Delaware Bay to off Key West, Fla. (Fig. 3; Theroux and Wigley footnote 4, table 3).

The main distribution for this genus according to Coomans (1962) is Virginian, Carolinian, and Caribbean in the northwest Atlantic and Celtic in Europe.

The depth range of our samples is 6 to 500 m with a mean depth of 81 m. The majority of samples are from continental shelf depths of < 200 m. One-third of the samples are in the 0-24 m depth range grouping, 25% are in the 100-199 m grouping and nearly 22% in depths between 25 and 49 m. In terms of density, *Abra* distribution is greatest (33%) in the shallowest depth range grouping, while 25 and 22% of the specimens are in the 100-199 m and 25-49 m groupings, respectively (Table 234).

Samples containing *Abra* were most plentiful (35 to 25%) in sandy substrates (sand, sand-shell, and silty sand); somewhat lower quantities (2 to 7%) occurred in other substrates (gravel, shell, and silt). The greatest density of specimens, 35%, was found in sand; sand-shell and silty sand substrates each yielded 25% of the specimens; gravel, shell, and silt sediments contained small percentages of specimens (Table 235).

Genus *Cumingia* Sowerby 1833

***Cumingia tellinoides* (Conrad 1830).[8] Tellin-like cumingia. Figure 33.**

The tellin-like cumingia is reported from Canadian waters, and to range from Nova Scotia to Saint Augustine, Fla.; it is also found in Texas (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris, 1973; Emerson et al. 1976).

This species is represented in our collection by two specimens from two samples (Table 5).

Our two samples are from off Portland, Maine, and in Buzzards Bay, Mass. (Fig. 33; Theroux and Wigley footnote 4, table 53).

This species is found in the Boreal, Virginian, and Carolinian zoogeographic provinces (Coomans 1962).

The depth range of this species is from 0.3 to 70 m (Porter 1974).

Our samples are from water depths of 1 and 45 m with a mean of 23 m. The 0-24 m and 25-49 m depth range groupings each contain 50% of both samples and specimens.

Only one of our samples contained information relating to the type of bottom upon which the organism was found, sand.

Genus *Semele* Schumacher 1817

***Semele bellastriata* (Conrad 1837). Cancellate semele. Figure 97.**

The cancellate semele occurs from Cape Hatteras, N.C., to Florida; it is found at Texas and the West Indies, and at the Bahamas and Bermuda and ranges south to Bahia, Brazil (Johnson 1934; Abbott 1968, 1974; Boss 1972; Morris 1973; Emerson et al. 1976).

Semele bellastriata is fairly common and is represented in the NEFC collection by 38 specimens from 19 samples (Table 5).

Our samples are on the continental shelf ranging from Cape Fear, N.C., to the midsection of the Florida Peninsula (Fig. 97; Theroux and Wigley footnote 4, table 172).

The published depth range for this species is 2 to 116 m (Porter 1974).

The range of depth occupied by our samples is 15 to 41 m with a mean of 29 m. The 25-49 m depth range grouping contains 68% of the samples and 79% of the specimens while the 0-24 m grouping contains 35% of the samples and 21% of the specimens (Table 236).

Boss (1972) reported that the cancellate semele is normally found in coarse sandy substrates.

Our samples were obtained from sand-shell and sand substrates; 63% of the samples and 79% of the specimens occurred in the latter and 37% of the samples and 21% of the specimens in the former (Table 237).

***Semele nuculoides* (Conrad 1841a). Nuculalike semele. Figure 98.**

This species is distributed from North Carolina at Cape Hatteras south through the Gulf of Mexico, it also occurs at the West Indies, the Lesser Antilles, and in the Caribbean, south to Brazil (Johnson 1934; Boss 1972; Morris 1973; Abbott 1974).

Semele nuculoides is represented in the NEFC Specimen Reference Collection by 146 specimens from 62 samples (Table 5).

The samples in the NEFC collection range from Cape Hatteras, N.C., on the continental shelf, south to the middle portion of the Florida Peninsula (Fig. 98; Theroux and Wigley footnote 4, table 173).

According to Boss (1972) the depth range for this species is between 4 and 183 m.

[8]Abbott (1974) has "(Conrad, 1831)" for this species, it should be (Conrad 1830), see under References.

The NEFC samples are from depths which range between 6 and 50 m with a mean of 26 m. The 25-49 m depth range grouping contains the majority of both samples (52%), and specimens (68%); next most plentiful amounts of samples and specimens are in the 0-24 m grouping which contains 45% of the samples and 30% of the specimens, while the deepest grouping in which they are grouped, 50-99 m, contains 3% of the samples and 3% of the specimens (Table 238).

Boss (1972), in his monograph on the family Semelidae, reported that this species is normally found in offshore sandy substrates.

Our samples occurred in shell, which contained 2% of the samples and 0.7% of the specimens, sand-shell with 27% of the samples and 23% of the specimens; the majority occurred in sand, which contained 66% of the samples and 59% of the specimens, while silty sand substrates contained 5% of the samples and 17% of the specimens (Table 239).

***Semele purpurascens* (Gmelin 1791). Purplish semele. Figure 98.**

The purplish semele is distributed from North Carolina to Florida and the Gulf of Mexico, it occurs in the West Indies, and is also found at Uruguay and Brazil along the South American coast (Johnson 1934; Abbott 1968, 1974; Boss 1972; Morris 1973; Emerson et al. 1976).

Semele purpurascens is fairly common, however, the NEFC collection contains only six specimens from four samples (Table 5).

Our samples are from the continental shelf with one sample occurring off the Cape Hatteras, N.C., coast, another off Charleston, S.C., and another slightly north of Miami, Fla. (Fig. 98; Theroux and Wigley footnote 4, table 174).

This species has a fairly wide bathymetric range, occurring in water depths which range from ±1 to 130 m (Abbott 1968; Porter 1974).

The NEFC samples are from water depths which range between 30 and 80 m with a mean of 59 m. The 25-49 m and 50-99 m depth range groupings contain 25 and 75% of the samples, and 33 and 67% of the specimens, respectively (Table 240).

Boss (1972) reported that this species is normally found in sandy substrates.

Our samples were found in sand-gravel, sand-shell, and sand. Sand-gravel substrates contained 50% of the samples and 50% of the specimens; sand-shell contained 25% of the samples as did sand, but 17% of the specimens occurred in sand-shell and 33% in sand (Table 241).

***Semele* sp. Figure 98.**

The NEFC Specimen Reference Collection contains three specimens from two samples which are classified to the generic level *Semele* sp. (Table 5).

The samples bearing this designation are from the continental shelf off the central section of the Florida Peninsula (Fig. 98; Theroux and Wigley footnote 4, table 175).

The samples are from water depths of 20 and 22 m. These depths place both samples in the 0-24 m depth range grouping.

One of our samples containing two specimens (68%), occurred in shell, while the other sample occurred in sand-shell and contained 32% of the specimens.

Family SOLECURTIDAE
Genus *Tagelus* Gray 1847

***Tagelus plebeius* (Lightfoot 1786). Stout tagelus. Figure 103.**

This species is distributed from Cape Cod, Mass., to Florida and Texas and other Gulf States, it is also present in the West Indies and has been found in Brazil (Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

Tagelus plebeius, which is moderately common to locally abundant throughout its range, is represented in the NEFC collection by four specimens from one sample (Table 5).

Our sample is from the western slope of Cape Cod, Mass., in Buzzards Bay (Fig. 103; Theroux and Wigley footnote 4, table 184).

Coomans (1962) placed the distribution of this species in the Virginian, Carolinian, and Caribbean provinces.

The stout tagelus is normally an intertidal inhabitant and ranges down to approximately 8 m depth (Abbott 1968, 1974).

Our sample is from a water depth of 1 m placing it in the 0-24 m depth range grouping. The bottom sediment was sand-gravel.

Family ARCTICIDAE
Genus *Arctica* Schumacher 1817

***Artica islandica* (Linné 1767). Ocean quahog. Figure 8.**

Arctica islandica (formerly *Cyprina islandica*) is a commercially important bivalve of the northeastern United States with landings in 1978 totalling 23 million pounds of meats, an increase of 22% over the 1977 landings (Pileggi and Thompson 1979).

In the western Atlantic the ocean quahog ranges from the Arctic Ocean and Newfoundland to off Cape Hatteras, N.C. (Johnson 1934); La Rocque (1953), Abbott (1974), Morris (1973), and Emerson et al. (1976) listed it as also occurring at Iceland. In the eastern Atlantic, Tebble (1966) reported it from the British Isles, Iceland, the Faroes, Onega Bay in the White Sea, and the Bay of Biscay.

The ocean quahog occurs in 3.6% of our samples and represents 1.9% of the specimens in the collection (Table 5). It must be remembered, however, that these samples represent only material presently on hand in the Specimen Reference Collection and not the complete list of records concerning this species at the NEFC.

Our samples of this species range from Nova Scotia to Cape Hatteras, N.C. (Fig. 8; Theroux and Wigley footnote 4, table 13). The only embayment in which we found specimens was Cape Cod Bay, all other samples were confined to more offshore regions.

The zoogeographic distribution of the ocean quahog is Arctic, Boreal, and Virginian in the western Atlantic and Celtic in Europe (Coomans 1962); Gosner (1971) assigned it to the Boreal and Virginian provinces, and Dance (1974) to the Arctic, Boreal, and Transatlantic.

Reported water depths for this species range from 9 to 165 m (Johnson 1934; Abbott 1974). Clarke (1962) reported a depth of 1,094 m, but stated that this needs further confirmation.

Our samples range in depth from 10 to 400 m with a mean depth of 79 m. Fifty-seven percent of samples and specimens

are in the 50-99 m depth range grouping; abundance of both samples and specimens diminishes with increasing and decreasing depth range beyond this range (Table 242). Eleven samples containing 143 specimens are lacking information with regard to depth.

It has been reported that the ocean quahog is found on sandy mud substrates in the western Atlantic (Abbott 1974), and on firm bottoms of sand and muddy sand in the eastern Atlantic (Tebble 1966).

Fifty-six percent of our samples occurred in sand, 12% in clay, and 9% in silty sand. In terms of density 43% of the specimens occurred in clay, 32% in sand, and 12% in silty sand. Other sediment types provided 6% or less of both samples and specimens (Table 243). There are 52 samples containing 256 specimens which are unclassified with regard to sediment type.

Family VENERIDAE

There are 54 samples in our collection which yielded 117 specimens of organisms classified only to the familial level, Veneridae (Table 5).

Samples yielding members of this family range from Cape Hatteras, N.C., on the continental shelf, south to the environs of Miami, Fla. (Fig. 116; Theroux and Wigley footnote 4, table 207).

The range of depth for these samples is 10 to 62 m with a mean of 29 m. The majority of both samples and specimens are in the 25-49 m grouping which contains 57% of the samples and 59% of the specimens, while the 0-24 m grouping contains 37% of the samples and 36% of the specimens; the 50-99 m grouping contains 6% of the samples and 5% of the specimens (Table 244).

Members of the family Veneridae occurred most abundantly in sand-shell substrates which yielded 44% of the samples and 47% of the specimens, while sand substrates contained 35% of the samples and 35% of the specimens. Other sediment types in which members of this family occurred were gravel, sand-gravel, shell, and silty sand (Table 245).

Genus *Callista* Poli 1791

***Callista eucymata* (Dall 1890). Glory-of-the-seas venus. Figure 21.**

Abbott (1968, 1974) noted that this species is distributed from north Carolina to the southern half of Florida, and from Texas to Brazil, and is uncommon to moderately common within its range.

There are 14 specimens of this species from 12 samples in the NEFC collection (Table 5).

Our material ranges from Delaware Bay to southern Florida; there are three occurrences north of Cape Hatteras, N.C.: one in Delaware Bay and two at the mouth of Chesapeake Bay; the remaining nine samples are south of Cape Hatteras (Fig. 21; Theroux and Wigley footnote 4, table 34).

The depth range for this species is from 4 to 214 m (Abbott 1968, 1974; Porter 1974). Our samples range from 7 to 74 m in depth with a mean of 21 m. Eighty-three percent of the samples and 79% of the specimens are in the shallowest (0-24 m) depth range grouping; the 25-49 m and 50-99 m groupings each contain 8% of the samples but 7 and 14% of the specimens, respectively (Table 246).

The glory-of-the-seas venus is usually found in sand substrates (Abbott 1968). This observation is true for 58% of our samples and 57% of our specimens. Twenty-five percent of the samples and 29% of the specimens were in sand-shell substrates, while 8 and 7%, respectively, occurred in gravel and silty sand substrates (Table 247).

Genus *Chione* Megerle 1811

***Chione intapurpurea* (Conrad 1849). Lady-in-waiting venus. Figure 24.**

Chione intapurpurea is reported to occur from North Carolina to Florida, the West Indies, Texas, and the Gulf of Mexico south to Brazil (Johnson 1934; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

The NEFC collection contains eight samples yielding nine specimens of this uncommon species (Table 5).

Our samples are distributed on the continental shelf from south of Charleston, S.C., to slightly north of Miami, Fla. (Fig. 24; Theroux and Wigley footnote 4, table 38).

This species is reported to occur in water depths from 2 to 86 m (Abbott 1974).

Our samples are from water depths of from 10 to 28 m with a mean of 17 m. Eighty-eight percent of the samples and 89% of the specimens are in the 0-24 m depth range grouping, while 13% of the samples and 11% of the specimens are in the 25-49 m depth range grouping (Table 248).

This species is found on coarse gray sand and under rocks (Abbott 1968); it also occurs on gravelly bottom (Morris 1973).

Our specimens were found in sand-shell and sand substrates. These two sediment types each contained 50% of the samples but sand-shell substrates contained 56% of the specimens while sand contained 44% (Table 249).

***Chione latilirata* (Conrad 1841b). Imperial venus. Figure 25.**

This species occurs from North Carolina to Florida and to Texas; it also occurs in the West Indies and Brazil (Johnson 1934; Abbott 1968, 1974; Morris 1973).

The imperial venus is a rather uncommon offshore species of the U.S. east coast of which there are 24 specimens from 17 samples in our collection (Table 5).

Our samples are located on the continental shelf between Cape Hatteras, N.C., and the central portion of Florida (Fig. 25; Theroux and Wigley footnote 4, table 39).

Depths in which this organism is found range from 18 to 227 m (Johnson 1934).

The depth range of our samples is from 19 to 66 m with a mean of 36 m. The majority of both samples (76%) and specimens (83%) are in the 25-49 m depth range grouping. Twelve percent of the samples and 8% of the specimens occur in both the 0-24 m and the 50-99 m depth range groupings (Table 250).

Our samples were found in sand-shell and sand substrates. Sand contained the majority of samples (71%) and specimens (67%) while the remainder were in sand-shell (Table 251).

***Chione* sp. Figure 26.**

There are 58 specimens from 36 samples in our collection which bear the designation *Chione* sp. (Table 5).

Our samples are distributed on the continental shelf from just southeast of Cape Hatteras, N.C., south to the southern third of Florida, north of Miami (Fig. 26; Theroux and Wigley footnote 4, table 40).

The 36 samples, yielding specimens of this taxon, are from water depths ranging between 10 and 43 m with a mean of 21 m. Seventy-eight percent of the samples and 83% of the specimens are in the 0-24 m depth range grouping, whereas 22% and 17% of the samples and specimens, respectively, are in the 25-49 m grouping (Table 252).

The majority of both samples and specimens occurred in sand which contained 42 and 43%, respectively; the next major substrate type was sand-shell, which contained 39 and 38% of samples and specimens, respectively. Shell substrates accounted for 14% of the samples and 16% of the specimens, while silty sand substrates accounted for 6 and 4%, respectively (Table 253).

Genus *Gemma* Deshayes 1853

***Gemma gemma* (Toten 1834). Amethyst gem clam. Figure 45.**

This tiny bivalve is very common to excessively abundant (Abbott 1974; Emerson et al. 1976).

Gemma gemma occurs from northern seas around Newfoundland to Florida and the Bahamas, and ranges into Texas and along the Gulf Coast; it has also been introduced into the Pacific at Puget Sound, Wash., and extends south to San Francisco; in the Arctic it extends from the Parry Islands south to and including Labrador (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

The NEFC collection contains 2,211 specimens representing 2% of the entire number of specimens from only 33 samples (Table 5).

The distribution of the NEFC collection samples is patchy although they did yield large numbers of specimens. The first patch occurs in the Cape Cod region, the next small number of samples is in Delaware Bay; another region from which samples were obtained is in Albemarle Sound and off the coast of Cape Hatteras, N.C., and another sampling site is on the continental shelf to the east of Jacksonville, Fla. (Fig. 45; Theroux and Wigley footnote 4, table 74).

This species is found in the Boreal, Virginian, and Carolinian zoogeographic provinces (Coomans 1962); Gosner (1971) placed it in the Boreal and Virginian provinces.

The depth range of the amethyst gem clam is from the littoral zone to 30 m (Morris 1951; Abbott 1968, 1974; Gosner 1971; Porter 1974).

The depth range of our samples is 0 to 66 m with a mean of 6 m. Ninety-four percent of the samples and nearly 100% of the specimens are in the 0-24 m depth range grouping; 3% of the samples are in the 25-49 m and 50-99 m groupings with each accounting for $< 0.1\%$ of the specimens (Table 254).

This species occurs on sandy shores (Morris 1951).

Our samples were found in three sediment types: sand-shell, sand, and silty sand. Sand substrates accounted for 75% of the samples but only 15% of the specimens, while sand-shell substrates contained 6% of the samples but 80% of the specimens; silty sand contained 19% of the samples and 5% of the specimens (Table 255). Seventeen samples containing 1,803 specimens are unclassified with regard to sediment type.

Genus *Liocyma* Dall 1870

***Liocyma fluctuosa* (Gould 1841). Fluctuating liocyma. Figure 54.**

This northern species is found in both the Atlantic and Pacific Oceans. In the Atlantic it occurs from Greenland to Nova Scotia and in the Pacific from Alaska to British Columbia (Johnson 1934; La Rocque 1953; Clarke 1962; Morris 1973; Abbott 1974). Ockelmann (1958), who reported its occurrence in Arctic regions, stated that it is panarctic and probably truly circumpolar.

This moderately common bivalve species is represented in the NEFC collection by 22 specimens from 1 sample (Table 5).

Our sample is from the Scotian Shelf (Fig. 54; Theroux and Wigley footnote 4, table 91).

Ockelmann (1958) reported it as occurring in from 2 to 228 m of water; Clarke (1962) reported it as occurring in from 18 to 2,440 m of water, but stated that the authenticity of the abyssal records is questionable.

Our sample is from a depth of 51 m which places it in the 50-99 m depth range grouping.

The sample was obtained from a gravel substratum.

Genus *Mercenaria* Schumacher 1817

***Mercenaria mercenaria* (Linné 1758). Northern quahog. Figure 61.**

Mercenaria mercenaria is the commercially important bivalve also known as the hard shelled clam, quahog, stuffer, cherry stone, or littleneck among other common names, which vary from locality to locality within its range. Landings in 1978 produced 13.3 million pounds of meat, valued at $29.7 million (Pileggi and Thompson 1979).

The normal distribution of this species is from the Gulf of St. Lawrence to Florida, into the Gulf of Mexico, south to the Yucatan Peninsula; further, *Mercenaria mercenaria* has been introduced to Humboldt Bay, Calif., and into England and other European waters (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Emerson et al. 1976).

Although it is very common and locally very abundant within our study area, there are only 21 specimens from 9 samples in the NEFC collection (Table 5). This paucity of material is directly attributable to this species preference for intertidal and shallow water habitats which are not normally sampled during research cruises conducted by this Center.

The majority of our samples are from the Cape Cod region with one sample from the coast of New York (Fig. 61; Theroux and Wigley footnote 4, table 106).

The zoogeographic distribution of this species is Boreal, Virginian, and Carolinian in the western Atlantic, and Celtic in Europe (Coomans 1962). Gosner (1971) considered it Boreal and Virginian, while Dance (1974) placed it in the Boreal province in eastern North America as well as in the Transatlantic, Caribbean, and Californian provinces.

As previously mentioned this is a shallow water organism ranging from between tide marks down to only a few meters depth (Gosner 1971; Morris 1973).

The NEFC samples are from water depths ranging between 1 and 15 m with a mean of 5 m, which places them in the 0-24 depth range grouping (Table 256).

Only three of our samples, containing eight specimens, had sediment information included in the sampling data. Two samples (67%) occurred in silty sand substrates, containing six specimens (75%); one sample occurred in sand-gravel and contained two specimens (Table 257). The remaining 6 samples with 13 specimens are unclassified with regard to sediment type.

Genus *Periglypta* Jukes-Browne 1914

***Periglypta listeri* (Gray 1838). Princess venus. Figure 85.**

The princess venus occurs from southeast Florida to the West Indies and to southern Texas (Johnson 1934; Morris 1973; Abbott 1974; Emerson et al. 1976).

Periglypta listeri is a moderately common warm water bivalve of which there are six specimens from two samples in the NEFC collection (Table 5).

Our two samples are from the continental shelf, one off the Florida keys, the other off the central coast of Florida (Fig. 85; Theroux and Wigley footnote 4, table 146).

Both Morris (1973) and Abbott (1974) reported that this is a shallow water inhabitant while Emerson et al. (1976) reported that it is occasionally found on beaches.

The two samples in the NEFC collection are from water depths of 71 and 84 m. This depth range places both samples in the 50-99 m depth range grouping.

Two sediment types were involved in the distribution of this species, sand-shell and silty sand, each of which contained 50% of the samples; 17% of the specimens occurred in sand-shell, while 83% of the specimens occurred in silty sand.

Genus *Pitar* Roemer 1857

***Pitar morrhuanus* Linsley 1845.[9] Morrhua venus. Figure 89.**

Pitar morrhuanus is a fairly common species, especially off the New England coast; there are 723 specimens from 102 samples in the NEFC Specimen Reference Collection (Table 5).

The morrhua venus is distributed from the Gulf of St. Lawrence and Prince Edward Island to approximately North Carolina (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

The samples in our collection are distributed on the continental shelf from Maine to Cape Hatteras, N.C. (Fig. 89; Theroux and Wigley footnote 4, table 153).

This species is an inhabitant of the Boreal and Virginian provinces of the northwest Atlantic (Coomans 1962; Gosner 1971).

The published depth range for this species is 4 to 183 m (Abbott 1968; Gosner 1971).

Our samples are from depths which range between 0 and 900 m with a mean of 62 m. The anomalous deep water record involves only one small juvenile clam, the majority were well within normal depths for this species. The majority of both samples and specimens are in the shallowest depth range grouping, 0-24 m, which contains 35% of the samples and 80% of the specimens; the 25-49 m depth range grouping contains 24% of the samples and 7% of the specimens; the 50-99 m grouping, 32% of the samples and 10% of the specimens; the remaining three groupings, 100-199, 200-499, and 500-999 m contain 5% or less of the samples and 1.4 to 0.1% of the specimens (Table 258).

Two sediment types predominated for this species, sand and silty sand; these substrates contained 62 and 25% of the samples, respectively, and 63 and 25% of the specimens, respectively; other sediment types in which the species occurred, in significantly smaller amounts, were till, sand-shell, silt, and clay. Table 259 lists the abundances for these sediment types of samples and specimens. There are 13 samples containing 468 specimens which are unclassified with regard to sediment type.

***Pitar* sp. Figure 90.**

Samples containing members of this genus are distributed from south of Cape Hatteras on the continental shelf to the Florida Keys (Fig. 90; Theroux and Wigley footnote 4, table 154).

The NEFC Specimen Reference Collection contains 130 specimens from 60 samples of bivalves which are classified to the generic level *Pitar* (Table 5).

The NEFC samples are from depths which range between 13 and 102 m with a mean of 33 m. The majority of these samples are in the 25-49 m depth range grouping which contains 70% of the samples and 72% of the specimens; the 0-24 m grouping contains 25% of the samples and 23% of the specimens, while the two range groupings in deeper areas, the 50-99 m and 100-199 m contain 3.3 and 2%, respectively, for samples and 4 and 1%, respectively, for specimens (Table 260).

Sand and sand-shell substrates were the preferred sediment types for this genus, with sand the leader accounting for 68% of the samples and 69% of the specimens; sand-shell contained 22% of the samples and 23% of the specimens; other sediment types in which samples containing *Pitar* were found were gravel, with 2% of the samples and 2% of the specimens, shell, with 3% of the samples and 2% of the specimens, and silty sand where 5% of the former and 5% of the latter were obtained (Table 261).

Family PETRICOLIDAE
Genus *Petricola* Lamarck 1801

***Petricola pholadiformis* Lamarck 1818. False angel wing. Figure 88.**

The false angel wing is a widely distributed species occurring in both the Atlantic and Pacific Oceans. In the northwest Atlantic it ranges from the Gulf of St. Lawrence into the Gulf of Mexico to Texas; it is also present in the Caribbean south to Uruguay; it also occurs in the Mediterranean Sea, Black Sea, and along the west African coast to Senegal, and the French Congo; in the Pacific it occurs at California (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Emerson et al. 1976).

[9]Abbott (1974) has "Linsley, 1848" for this species, it should be Linsley 1845, see under References.

Although *Petricola pholadiformis* is very common, the NEFC collection contains only 27 specimens from 7 samples of this species (Table 5).

The samples in the NEFC collection are from two localities; the majority of samples are in the Cape Cod region, especially in Buzzards Bay, and one sample is from just north of Jacksonville, Fla. (Fig. 88; Theroux and Wigley footnote 4, table 152).

The real or main distribution of this species is in the Boreal, Virginian, and Carolinian provinces in the northwest Atlantic and Celtic in the eastern Atlantic (Coomans 1962); Gosner (1971) placed it in the Boreal and Virginian provinces, while Dance (1974) considered it to occupy the Boreal, Mediterranean, West African, Transatlantic, Caribbean, and Californian provinces.

This species is primarily intertidal; however, it does range down to approximately 13 m depth (Morris 1951, 1973; Porter 1974).

The range of depth for the NEFC samples is 1 to 26 m with a mean of 7 m. The majority of both samples and specimens are in the shallowest depth range grouping, the 0-24 m, where 86% of the samples and 96% of the specimens are grouped; the 25-49 m grouping contains 14% of the samples and 4% of the specimens (Table 262).

The most common habitat for the false angel wing is in stiff clays, peats, and in mud banks since it is a borer (Morris 1951, 1973; Abbott 1968, 1974).

There was only a small amount of sediment information accompanying the NEFC samples. Three samples contained sediment data: one from shell, one in sand, and one in silty sand. Table 263 lists the distribution of samples and specimens with regard to sediment type. There are 4 samples containing 21 specimens which are unclassified with regard to sediment type.

Order MYOIDA
Family MYIDAE

Genus *Mya* Linné 1758

***Mya arenaria* Linné 1758. Soft-shell clam. Figure 68.**

Mya arenaria is a commercially valuable bivalve of the northeast United States which, in 1978, yielded 10.1 million pounds of meats (Pileggi and Thompson 1979). Its commercial importance has resulted in a multitude of common names by which this bivalve is known, among them are the following: soft-shell clam, steamer clam, long clam, soft clam, sand gaper, long neck clam, nannynose, mannynose, and soft-shelled clam.

The normal distribution of the soft-shell clam is from Labrador to South Carolina, extending, locally, south to Florida; it is also distributed throughout western Europe and has been introduced to western U.S. waters at Alaska and Monterey, Calif.; there are also small isolated populations in Arctic regions (Johnson 1934; Foster 1946; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Tebble 1966; Abbott 1968, 1974; Emerson et al. 1976).

There are 290 specimens of this bivalve from 64 samples in the NEFC collection (Table 5).

Our samples are from the northeastern sector of the study area from the inshore waters of Maine, New Hampshire, Massachusetts, south to New York State, and New Jersey; there is one isolated community at Charleston, S.C. (Fig. 68; Theroux and Wigley footnote 4, table 116).

Coomans (1962) placed the distribution of *Mya arenaria* in the Arctic, Boreal, and Virginian zoogeographic provinces in the western Atlantic, and the Celtic province in Europe; Gosner (1971) placed it in the Boreal and Virginian provinces; Dance (1974) considered it to occupy the Boreal, Transatlantic, Aleutian, Californian, and Japonic provinces.

Mya arenaria is primarily an intertidal organism; however, it does on occasion, in certain areas, reach subtidal depths, 3 to 9 m, and perhaps deeper (Abbott 1968; Gosner 1971).

The depth range of our samples is from 0 to 192 m with a mean depth of 43 m. The majority of samples (44%) and specimens (50%) are in the 0-24 m depth range grouping; 32% of the samples and 34% of the specimens are in the 50-99 m grouping; 16% of the samples and 10% of the specimens are in the 25-49 m grouping, and 8% of the samples and 6% of the specimens in the 100-199 m grouping (Table 264). There are two samples containing nine specimens for which no depth information is available.

Of the nine sediment types considered in this report, *Mya arenaria* was absent from only one, sand-shell. The majority of samples and specimens occurred in silty sand substrates which contained 38% of the samples and 42% of the specimens; next highest amount occurred in clay with 21% of the samples and 20% of the specimens. Both sand and silt contained 13% of the samples, but 5 and 29% of the specimens, respectively. Smaller amounts occurred in gravel, sand-gravel, till, and shell substrates (Table 265). Eleven samples containing 28 specimens are unclassified with regard to sediment type.

Family CORBULIDAE

Our collection contains 150 specimens from 56 samples which for various reasons were identified to the family level Corbulidae (Table 5).

The samples containing members of this taxon are distributed on the continental shelf between Cape Hatteras, N.C., and Miami, Fla. (Fig. 29; Theroux and Wigley footnote 4, table 46).

The samples containing members of the Corbulidae range in depth from 5 to 128 m with a mean of 30 m. Fifty-nine percent of the samples and 56% of the specimens are in the 0-24 m range grouping; 21 and 25%, respectively, in the 25-49 m grouping; 18% of both samples and specimens are in the 50-99 m range grouping, and 2% of the samples and 1% of the specimens are in the 100-199 m grouping (Table 266).

Members of this taxon preferred sandy substrates over coarser or finer sediments. Forty-one percent of the samples and 38% of the specimens occurred in sand; 38% of the samples and 38% of the specimens occurred in sand-shell, and 14 and 19%, respectively, occurred in silty sand. The other two sediment types which contained members of this taxon were shell with 5% of the samples and 4% of the specimens and gravel with 2 and 1%, respectively (Table 267).

Genus *Corbula* Brugière (1792)

***Corbula contracta* Say 1822. Contracted corbula. Figure 27.**

The contracted corbula is reported to occur from Cape Cod

to Florida, the West Indies, and is also found in Brazil (Johnson 1934; Morris 1951, 1973; Abbott 1968, 1974; Emerson et al. 1976).

Corbula contracta is a common bivalve species of the northwest Atlantic of which there are 22 samples containing 46 specimens in our collection (Table 5).

Our samples are primarily from off New England shores. A group of samples occurs on the central part of Georges Bank, one off the coast of Maine, several occur in Nantucket and Vineyard Sounds, and another grouping south of Nantucket Shoals on the outer edge of the continental shelf (Fig. 27; Theroux and Wigley footnote 4, table 43).

The bathymetric distribution of this species ranges from 0.5 to 115 m (Johnson 1934; Porter 1974).

Our samples are from water depths ranging between 15 and 150 m with a mean of 58 m. Forty-six percent of the samples and 41% of the specimens are in the 50-99 m depth range grouping, 27% of the samples and 28% of the specimens in the 25-49 m grouping, 13% of the samples are in the 0-24 m and 100-199 m groupings, specimen percentage in each of these groupings is 9 and 22%, respectively (Table 268).

This species reportedly inhabits sand and mud substrates (Morris 1951).

Our samples also came from sand and muddy substrates, although the sandier substrates were preferred. Sand contained 53% of the samples and 49% of the specimens, while silty sand contained 32 and 27%, respectively. Muddy fractions, silt and clay, contained 5% of the samples and 10% of the specimens for the former and 11% and 15% for the latter, respectively (Table 269). There are three samples containing five specimens which are unclassified with regard to sediment type.

***Corbula krebsiana* C. B. Adams 1852. Kreb's corbula. Figure 28.**

It is reported to occur at Florida and the West Indies by Johnson (1934) and Abbott (1974), while Andrews (1971) listed it as occurring at Jamaica and Texas; Andrews further stated that it is an uncommon, infaunal creature residing on offshore banks.

This species is represented by 97 specimens from 41 samples in the NEFC collection (Table 5).

Samples in the NEFC collection occur on the outer continental shelf from Cape Hatteras, N.C., to Miami, Fla. (Fig. 28; Theroux and Wigley footnote 4, table 44).

Depth range of this species is from 5 to 156 m (Johnson 1934).

Our samples range from 18 to 135 m in depth with a mean of 44 m. Sixty-three percent of the samples and 56% of the specimens are in the 25-49 m depth range grouping, while 22% of the samples and 35% of the specimens are in the 50-99 m grouping. The 0-24 m grouping and the 100-199 m grouping contain 10 and 5% of the samples and 6 and 3% of the specimens, respectively (Table 270).

Our specimens inhabited shelly and sandy substrates. Sand was by far the preferred sediment type, containing 63% of the samples and 59% of the specimens. Next largest amounts, 29 and 36% for samples and specimens, respectively, were in sand-shell substrates; shell substrates contained 5 and 3%, respectively, while silty sand substrates had the least with 2% of the samples and 2% of the specimens (Table 271).

***Corbula* sp. Figure 28.**

The NEFC collection contains one sample with two specimens of this taxon (Table 5).

The single sample containing the specimens of *Corbula* sp. is from the Maine coast (Fig. 28; Theroux and Wigley footnote 4, table 45), at 45 m depth in a clay sediment.

Family HIATELLIDAE

The NEFC collection contains 17 specimens from 7 samples which bear the classification Hiatellidae (Table 5).

There are two groups of samples containing members of the family Hiatellidae, one group occurs north of Cape Cod in the Gulf of Maine containing one sample on the Scotian Shelf and two samples in the southern Gulf of Maine, one north of Boston and the other east of Cape Cod. The second group occurs south of Charleston, S.C., to the northern portion of Florida (Fig. 49; Theroux and Wigley footnote 4, table 81).

Our samples range in depth from 29 to 110 m with a mean of 56 m. Three depth range groupings contain members of this taxon; they are the 25-49 m grouping with 57% of the samples and 29% of the specimens, the 50-99 m grouping with 29% of the samples and 12% of the specimens, and the 100-199 m grouping with 14 and 59%, respectively (Table 272).

Sand substrates contained 71% of samples but only 35% of the specimens, while sand-gravel substrates, although containing 14% of the samples, contained 59% of the specimens. One sample (14%) containing one specimen (6%) occurred in clay substrates (Table 273).

Genus *Cyrtodaria* Cuvier 1800

***Cyrtodaria siliqua* (Spengler 1793). Northern propeller clam. Figure 40.**

This species is moderately common offshore, and occasionally found in fish stomachs (Abbott 1974).

The northern propeller clam is distributed from Arctic Ocean regions to Cape Cod, Mass., Georges Bank, and Rhode Island (Johnson 1934; La Rocque 1953; Ockelmann 1958; Morris 1973; Abbott 1974).

This species is represented in our collection by two specimens from one sample (Table 5).

The single sample we have in our collection is from off Cape Ann, Mass. (Fig. 40; Theroux and Wigley footnote 4, table 66).

The reported depth range for this species is 9 to 165 m (Johnson 1934; Abbott 1974).

The sample in our collection is from 70 m of water placing it in the 50-99 m depth range grouping.

There is no information relating to sediment in our sample.

Genus *Hiatella* Daudin, in Bosc 1801

***Hiatella arctica* (Linné 1767). Arctic saxicave. Figure 48.**

This species is widely distributed throughout the Northern Hemisphere, it ranges from Arctic seas to deep water in the West Indies and off Panama; it is also found in the British Isles, in the Mediterannean and Bering Seas, and in the Pacific Ocean (Johnson 1934; La Rocque 1953; Ockelmann 1958; Clarke 1962; Tebble 1966; Abbott 1968, 1974; Morris 1973).

This is a common, small bivalve which is well represented in the NEFC collection which contains 3,474 specimens, approximately 3% of the entire collection, from 149 samples, representing 1% of the entire collection (Table 5).

All of our samples are in the northern sector of our study area, occupying the periphery of the Gulf of Maine, the Scotian Shelf, and Georges Bank to deep slope water areas south of Cape Cod, Mass. (Fig. 48; Theroux and Wigley footnote 4, table 79).

The zoogeographic distribution of this species, according to several authors, is as follows: Ockelmann (1958) listed it as occupying the Panarctic-Boreal and Mediterannean-Atlantic provinces, stating that it is probably cosmopolitan and circumpolar; Clarke (1962) listed it as occupying the Panarctic and Boreal provinces; Coomans (1962) placed it in the Arctic-boreal, Virginian, Caribbean, Carolinian, and Celtic provinces; Gosner (1971) placed it in the Boreal and Virginian provinces, while Dance (1974) placed it in the Mediterannean, Atlantic, Transatlantic, and Caribbean provinces.

The Arctic saxicave enjoys a wide bathymetric range occurring from intertidal and littoral regions out to 366 m in the northwest Atlantic (Johnson 1934; Abbott 1968, 1974). Ockelmann (1958) reported it as occurring from 0 down to 2,190 m at West Ireland and mentions that dead shells are found in the North Atlantic down to about 2,380 m. Clarke (1962) reported it as occurring between 0 and 2,968 m in depth.

Our samples range from 18 to 232 m in depth with a mean of 81 m. Fifty-one percent of the samples and 24% of the specimens are in the 50-99 m depth range grouping while 23% of the samples containing 69% of the specimens are in the 25-49 m grouping; the 100-199 m grouping contains 22% of the samples but only 5% of the specimens; the 200-499 m grouping contains 3% of the samples but only 0.1% of the specimens, while the shallowest depth range grouping, 0-24 m contains 2% of the samples and 2% of the specimens (Table 274).

Morris (1951) reported that the Arctic saxicave may be found in clay and limestone substrates while Abbott (1968, 1974) reported it occurring among kelp holdfasts and in rock crevices and also that it has been found in sponges.

Our samples were found in all of the 9 substrate types considered in this report. Chief among substrate types is gravel which contained 29% of the samples and 61% of the specimens, sand-gravel contained 24% of the samples and 20% of the specimens. There is a general tendency of decreasing abundance, both in terms of samples and specimens, with decreasing sediment particle size. Both till and sand substrates contained 12% of the samples but only 4 and 10% of the specimens, respectively. In order of diminishing abundance, silty sand contained 8%, clay 5%, shell 3%, and silt 2% of the samples, and lowered specimen amounts as well (Table 275). Thirty-two samples containing 121 specimens are unclassified with regard to sediment type.

***Hiatella striata* Fleuriau 1802. Figure 49.**

Hiatella striata is represented in the NEFC collection by eight specimens from two samples (Table 5).

Our two samples are from the western end of Georges Bank east of Great South Channel (Fig. 49; Theroux and Wigley footnote 4, table 80).

Porter (1974) reported a +1 m depth range for this species.

Our samples containing *Hiatella striata* are from 49 and 70 m water depth. The 25-49 m and 50-99 m depth range groupings each contain 50% of both samples and specimens.

No information with regard to sediment type is available for the two samples in our collection.

Genus *Panomya* Gray 1857

***Panomya arctica* (Lamarck 1818). Arctic rough mya. Figure 83.**

The Arctic rough mya is circumpolar and inhabits both the North Atlantic and North Pacific Oceans. In the Atlantic it ranges from Arctic seas to Chesapeake Bay, while in the Pacific it occurs from Unalaska to Point Barrow, Alaska; it is also known from northern European waters (Johnson 1934; Morris 1951, 1973; Tebble 1966; Abbott 1974).

Panomya arctica is a common northern seas bivalve that is represented in the NEFC collection by 64 specimens from 19 samples (Table 5).

Our samples are from the Gulf of Maine region with one sample occurring in upper continental slope waters south and east of Long Island, N.Y. (Fig. 83; Theroux and Wigley footnote 4, table 142).

Coomans (1962) placed this species in the Arctic, Boreal, and Virginian provinces in the western Atlantic, and in the Celtic province in Europe.

The depth distribution of this species ranges from approximately 46 m down to 600 m (Johnson 1934; Abbott 1974).

Our samples range in depth between 38 and 293 m with a mean of 126 m. The majority of both samples and specimens are in the 50-99 m depth range grouping which contains 53 and 78%, respectively; next largest amounts occur in the 100-199 m grouping which contains 26 and 14%, respectively; there are 16% of samples and 6% of specimens in the 200-499 m grouping; the shallowest depth range is the 25-49 m grouping which contains 5% of the samples and 2% of the specimens (Table 276).

This species inhabits mud, gravelly mud, and sandy gravel substrates (Morris 1951, 1973; Tebble 1966; Abbott 1974).

Our samples were obtained from a variety of sediment types including: silty sand which contained the majority of samples (33%) but only 10% of the specimens; till, however, contained the majority of the specimens (73%) but 25% of the samples; gravel contained 17% of the samples and 6% of the specimens; shell, sand, and clay each contained 8% of the samples but 4, 2, and 4% of the specimens, respectively (Table 277). There are 7 samples containing 16 specimens which are unclassified with regard to sediment type.

Family PHOLADIDAE
Genus *Barnea* Risso 1826

***Barnea truncata* (Say 1822). Fallen angel wing. Figure 17.**

This species enjoys a wide distribution along our shores ranging from Newfoundland, along the entire U.S. east coast into the Gulf of Mexico and south to Brazil; it also occurs in the West Indies and from Senegal to the Gold Coast in West Africa (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973; Emerson et al. 1976).

The NEFC collection contains 83 specimens from 4 replicate samples of this common and locally abundant species (Table 5).

Our specimens are all from one locality from replicate samples with different sampling gear in Great Harbor, Woods Hole, Mass. (Fig. 17; Theroux and Wigley footnote 4, table 27).

Provinces occupied by this species are the Boreal, Virginian, and Carolinian (Coomans 1962); Dance (1974) placed it in the Transatlantic province.

The fallen angel wing is a shallow water inhabitant ranging from the intertidal zone to about 7.6 m in depth (Abbott 1968, 1974; Porter 1974). The depth range of our samples is from 1 to 3 m with a mean of 1.7 m.

This species bores into mud, clay, and peat banks (Abbott 1968, 1974; Morris 1973; Emerson et al. 1976). Our samples came from the muds of Great Harbor at Woods Hole, Mass.

***Barnea* sp. Figure 18.**

Our collection contains two specimens from two samples of members of the genus *Barnea* (Table 5). The samples are from Buzzards Bay (Fig. 18; Theroux and Wigley footnote 4, table 28). Depth of the samples was 13 and 35 m with a mean of 24 m; sediment types at the sampling sites were gravel at one and clay at the other.

Genus *Xylophaga* Turton 1822

***Xylophaga atlantica* H. G. Richards 1942. Atlantic wood eater. Figure 117.**

This species ranges from Newfoundland and the Gulf of St. Lawrence to Virginia in the northwestern Atlantic (Ockelmann 1958; Clarke 1962; Morris 1973; Abbott 1974).

The NEFC Specimen Reference Collection contains 76 specimens of this species from 3 samples (Table 5).

Our samples are from two areas, one north of Cape Ann, Mass., and two replicate samples on the lower portion of the continental shelf opposite Atlantic City, N.J. (Fig. 117; Theroux and Wigley footnote 4, table 209).

This species has been found to occupy water depths which range between 0 and 3,720 m (Clarke 1962).

Our samples are from water depths which range between 60 and 458 m with a mean of 325 m. The depth range groupings which contain samples of this species are the 200-499 m grouping, which contains 67% of the samples and 96% of the specimens and the 50-99 m grouping which contains 33% of the samples and 4% of the specimens.

Although our samples did not contain any sediment information per se, the specimens were obtained from waterlogged wood which was collected at the sampling sites indicated in the distributional chart.

Subclass ANOMALODESMATA
Order PHOLADOMYOIDA
Family PANDORIDAE
Genus *Pandora* Lamarck 1799

***Pandora bushiana* Dall 1886. Bush's pandora. Figure 80.**

This species is distributed from North Carolina to Florida on the U.S. east coast. It occurs at Texas, and the West Indies; it is also present at the Bahama Islands, in Cuba, and south to Yucatan and Brazil (Johnson 1934; Boss and Merrill 1965; Abbott 1974).

Pandora bushiana is an uncommon warm water bivalve represented in our collection by 15 specimens from 8 samples (Table 5).

Our samples range from offshore of the outer banks of Cape Hatteras, N.C., to south of Charleston, S.C. (Fig. 80; Theroux and Wigley footnote 4, table 136).

The reported depth range for this species is between 6 and 46 m (Boss and Merrill 1965; Abbott 1974).

Our samples are from water depths ranging between 20 and 40 m with a mean of 32 m. The majority of samples (88%) and specimens (93%) are in the 25-49 m depth range grouping; the remaining 13% of the samples and 7% of the specimens are in the 0-24 m grouping.

All eight of our samples were obtained in sand sediment.

***Pandora gouldiana* Dall 1886. Gould's pandora. Figure 80.**

This species is distributed from the Gulf of St. Lawrence and Prince Edward Island in Canada to North Carolina (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Boss and Merrill 1965; Abbott 1968, 1974; Emerson et al. 1976).

Pandora gouldiana is represented in the NEFC collection by 144 specimens from 33 samples (Table 5).

Our samples range from the Nova Scotian continental shelf, along the inner periphery of the Gulf of Maine, out onto the southern part of Georges Bank, to the edge of the continental shelf off the entrance to Chesapeake Bay (Fig. 80; Theroux and Wigley footnote 4, table 137).

The distribution of this species is Boreal and Virginian on the eastern coast of North America (Coomans 1962; Gosner 1971).

The reported depth range for this species is from 0 to 183 m (Johnson 1934; Boss and Merrill 1965; Abbott 1974).

The NEFC samples range in depth from 0 to 119 m with a mean of 52 m. Abundance with increasing depth range is: the 0-24 m depth range grouping contains 21% of the samples and 28% of the specimens, the 25-49 m grouping 27% of the samples and 14% of the specimens, the 50-99 m grouping 39% of the samples and 51% of the specimens, while the 100-199 m grouping contains 12% of the samples and 8% of the specimens (Table 278).

All sediment types considered in this report, except sand-shell, contained members of this taxon. Five sediment types contained 4% of the samples, namely, gravel, sand-gravel, till, shell, and silty sand; in turn these contained 8, 1, 1, 3, and 1% of the specimens, respectively; sand substrates, however, contained the largest proportion of both samples and specimens with 63% for the former and 82% for the latter; silt and clay, the two finest grained substrates, contained 7.4 and 11%, respectively, for samples and 2 and 3%, respectively, for specimens (Table 279). There are 6 samples containing 39 specimens which are unclassified with regard to sediment type.

***Pandora inflata* Boss and Merrill 1965. Inflated pandora. Figure 81.**

This species is distributed from New Jersey to both sides of Florida, and according to Boss and Merrill is most populous in the Straits of Florida (Boss and Merrill 1965; Abbott 1974).

Pandora inflata is represented in the NEFC collection by 34 specimens from 17 samples (Table 5).

Our samples are from continental shelf and upper slope waters south of Nantucket Shoals, south to the offing of Chesapeake Bay (Fig. 81; Theroux and Wigley footnote 4, table 138).

Gosner (1971) reported the inflated pandora from the Carolinian zoogeographic province.

The range in depth of this species is from 48 to 165 m (Boss and Merrill 1965; Abbott 1974).

The range in depth for our samples is 21 to 194 m with a mean of 107 m. The majority of both samples and specimens are in the 100-199 m depth range grouping where 59 and 68%, respectively, occur; the 25-49 m grouping and the 50-99 m grouping each contain 18% of the samples but 18 and 12% of the specimens, respectively; the smallest number of samples and specimens are in the 0-24 m depth range grouping which contains 6% of the samples and 3% of the specimens (Table 280).

The NEFC samples of the inflated pandora were obtained from three sediment types with the majority occurring in silty sand substrates which contained 53% of the samples and 50% of the specimens, while sand substrates contained 41% of the samples and 47% of the specimens; sand-gravel contained 6 and 3%, respectively (Table 281).

***Pandora inornata* Verrill and Bush 1898. Inornate pandora. Figure 82.**

The inornate pandora occurs from Newfoundland to Cape Cod, Mass. (Johnson 1934; Ockelmann 1958; Boss and Merrill 1965; Abbott 1974).

Pandora inornata is an uncommon species, of which there are 159 specimens from 21 samples in the NEFC collection (Table 5).

Our samples are from the continental shelf on Georges Bank and in the Cape Code region (Fig. 82; Theroux and Wigley footnote 4, table 139).

Both Johnson (1934) and Abbott (1974) reported that this species occupies water depths between 18 and 82 m.

The NEFC samples are from water depths which range between 1 and 79 m with a mean of 34 m. The majority of samples are in the 0-24 m depth range grouping which contains 57% of the samples; however, this grouping only contains 33% of the specimens; the 25-49 m grouping contains 29% of the samples and 20% of the specimens, while the 50-99 m grouping, although containing 14% of the samples, contains the majority of the specimens, 47% (Table 282).

The distribution of samples and specimens in bottom sediment types ranging from coarsest to finest grained is as follows: three sediment types, gravel, sand-gravel, and sand-shell each contained 9% of the samples but 6, 1, and 1% of the specimens, respectively; sand contained the greatest amounts, 55% for samples and 88% of the specimens, while silty sand contained 18% of the samples and 4% of the specimens (Table 283). There are 10 samples containing 49 specimens which are unclassified with regard to sediment type.

***Pandora trilineata* Say 1822. Say's pandora. Figure 82.**

The distribution of this species is from North Carolina to Florida and Texas (Johnson 1934; Boss and Merrill 1965; Morris 1973; Abbott 1974; Emerson et al. 1976).

Pandora trilineata is a moderately common bivalve of which the NEFC collection contains 11 specimens from 9 samples (Table 5).

Our samples are from the continental shelf from slightly north of Cape Hatteras, N.C., south to the central section of the Florida Peninsula (Fig. 82; Theroux and Wigley footnote 4, table 140).

According to Morris (1973), Abbott (1974), and Porter (1974), the range of depth in which this species may be found is between 0 and 110 m.

Our samples are from water depths which range between 11 and 33 m with a mean of 21 m. Two-thirds of the samples are in the 0-24 m depth range grouping which contains 73% of the specimens, the remaining 33% of the samples are in the 25-49 m grouping, which contains 27% of the specimens (Table 284).

The majority of both samples and specimens occurred in sand substrates which contained 78% of the samples and 82% of the specimens; the only other substrate type in which this species occurred in our sample suite was sand-shell which contained 22% of the samples and 18% of the specimens (Table 285).

***Pandora* sp. Figure 83.**

The NEFC collection contains 8 samples from which 11 specimens are identified to the generic level of *Pandora* sp. (Table 5).

Our samples are from the continental shelf between Cape Cod, Mass., and Cape Fear, N.C., with one sample occurring in the eastern portion of the Gulf of Maine adjacent to Georges Bank (Fig. 83; Theroux and Wigley footnote 4, table 141).

Our samples range in depth between 15 and 230 m with a mean of 72 m. The majority of both samples and specimens are in the 50-99 m depth range grouping which contains 38% of the samples and 36% of the specimens; 25% of the samples and 27% of the specimens are in the 0-24 m depth range grouping, the same percentage of samples (25%), but 18% of the specimens occurs in the 25-49 m grouping while the 200-499 m depth range grouping contains 13% of the samples and 18% of the specimens (Table 286).

Samples yielding specimens of the genus *Pandora* occurred in two substrate types, sand and silty sand. Eighty-three percent of the samples and 75% of the specimens occurred in sand; and 17% of the samples and 25% of the specimens occurred in silty sand (Table 287). There are two samples containing three specimens which are unclassified with regard to sediment type.

Family LYONSIIDAE
Genus *Lyonsia* Turton 1822

***Lyonsia arenosa* Möller 1842. Sanded lyonsia. Figure 56.**

This small bivalve enjoys a wide distribution both in the Atlantic and Pacific Oceans. In the Atlantic it ranges from Greenland to Cape Ann, Mass., and in the Pacific from Alaska to Vancouver, British Columbia, and to Japan (Johnson 1934; La Rocque 1953; Clarke 1962; Morris 1973; Abbott 1974).

This is a moderately common bivalve species of which there are 81 specimens from 20 samples in the NEFC collection (Table 5).

Our samples are from the Georges Bank region, and also the Cape Cod region (Fig. 56; Theroux and Wigley footnote 4, table 96).

With regard to its zoogeographic distribution La Rocque (1953) considered it circumboreal; Ockelmann (1958) and Clarke (1962) considered it panarctic and circumpolar while Gosner (1971) placed it in the Boreal province.

The depth range for this species is 24 to 2,440 m (Johnson 1934; Clarke 1962).

Our samples are from water depths ranging between 1 and 426 m with a mean of 57 m. The 0-24 m and the 25-49 m depth range groupings contain 29% of the samples and 21 and 25% of the specimens, respectively; the 50-99 m grouping contains the majority of samples (38%) as well as the majority of specimens (53%); only one other depth range grouping contains members of this taxon, the 200-499 m grouping, with 5% of the samples and 1% of the specimens (Table 288).

The majority of our samples (60%) as well as specimens (67%) were found in sand; sand-gravel contained 20% of the samples and 20% of the specimens while silty sand and silt substrates each contained 10% of the samples and 5 and 8%, respectively, of specimens (Table 289). One sample containing five specimens is unclassified with regard to sediment type.

***Lyonsia hyalina* (Conrad 1830).[10] Glassy lyonsia. Figure 57.**

The geographic range is from the Gulf of St. Lawrence to Texas (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Emerson et al. 1976).

Lyonsia hyalina is common in the Northern Hemisphere, the NEFC collection contains 544 specimens of this species from 129 samples (Table 5).

Our samples are similarly distributed in that they range from the Scotian Shelf off Nova Scotia south to slightly north of Miami, Fla., occupying nearly the whole of the east coast continental shelf (Fig. 57; Theroux and Wigley footnote 4, table 97).

The main distribution is Boreal, Virginian, and Caribbean in the northwest Atlantic (Coomans 1962). Gosner (1971) listed it as occupying the Boreal and Virginian provinces, while Dance (1974) assigned it to the Boreal and Transatlantic provinces in eastern North America.

The depth range for this species is from low water at +1 to 62 m (Abbott 1974; Porter 1974).

Our samples range from 0 to 80 m depth with a mean of 38 m. The 0-24 m depth range grouping contains 33% of the samples and 22% of the specimens; the 25-49 m grouping contains 35% of the samples and 46% of the specimens, and the 50-99 m grouping contains 33% of the samples and 32% of the specimens (Table 290).

This species occupies sand and sandy mud bottoms (Morris 1951; Abbott 1968).

Among the various types of sediments in which we found this species the majority occupied sand substrates which yielded 78% of the samples and 91% of the specimens. Significantly smaller amounts occurred in sand-gravel, sand-shell, silty sand, silt, and clay substrates (Table 291). There are 14 samples containing 52 specimens which are unclassified with regard to sediment type.

***Lyonsia* sp. Figure 56.**

The NEFC collection contains five specimens from six samples classified to the generic level *Lyonsia* (Table 5).

The five samples of this taxon are from inshore areas and the outer continental shelf of the Middle Atlantic Bight region between Cape Cod, Mass., and the offing of Chesapeake Bay (Fig. 56; Theroux and Wigley footnote 4, table 98).

Our samples are from waters which range from 8 to 63 m in depth with a mean of 39 m. Forty percent of the samples occur in the 0-24 and 50-99 m depth range groupings which contain 33 and 50% of the specimens, respectively; the 25-49 m grouping contains 20% of the samples and 17% of the specimens (Table 292).

Members of this taxon occurred in three sediment types, the majority of samples (60%), as well as specimens (67%), were obtained from sand substrates; sand-gravel, and silty sand each contained 20% of the samples and 17% of the specimens (Table 293).

Family PERIPLOMATIDAE
Genus *Periploma* Schumacher 1816

***Periploma affine* Verrill and Bush 1898. Figure 85.**

According to Johnson (1934) and Abbott (1974), this species occurs only off Martha's Vineyard, Mass.

The NEFC collection contains 21 specimens from 2 samples of this rather rare bivalve species (Table 5).

The two samples in the NEFC Specimen Reference Collection are from off the tip of Cape Cod, Mass., in Cape Cod Bay (Fig. 85; Theroux and Wigley footnote 4, table 147).

According to the previously cited authors the depth range of this species is from 183 to 211 m.

Our samples are from 46 and 49 m of water, placing them in the 25-49 m depth range grouping.

This species was found in two substrate types, till and clay, each containing 50% of the samples; however, the tilloid substrate contained 95% of the specimens while the sample in clay contained 5% of the specimens.

***Periploma fragile* (Totten 1835). Fragile spoon clam. Figure 85.**

The distribution of the fragile spoon clam is from Newfoundland and Labrador to Cape Cod, Mass., with Arctic outposts at the Parry Islands (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Ockelmann 1958; Abbott 1974).

Periploma fragile is represented in the NEFC collection by 101 specimens obtained from 27 samples (Table 5).

The NEFC samples are from three separate areas; two samples occur in the Gulf of Maine off Portland, Maine, another group of samples is on the southern New England shelf and slope area south of Nantucket Shoals, and two more samples occur on the continental shelf off Atlantic City, N.J. (Fig. 85; Theroux and Wigley footnote 4, table 148).

Coomans (1962) placed this species in the Boreal and Virginian provinces.

The fragile spoon clam is a moderately shallow water inhabitant whose depth distribution ranges between 7 and 73 m (Abbott 1974).

[10]Abbott (1974) has "Conrad, 1831" for this species, it should be Conrad 1830, see under References.

Our suite of samples is from water depths which range between 23 and 458 m with a mean of 106 m. The majority of samples are in the 50-99 m depth range grouping which contains 78% of the samples and 88% of the specimens; the 0-24 and 25-49 m groupings each contain 4% of the samples, and 3 and 4% of the specimens, respectively, while the 100-199 m and 200-499 m groupings each contain 7% of the samples and 2 and 3% of the specimens, respectively (Table 294).

Morris (1951) reported that the fragile spoon clam inhabits sand substrates.

The distribution of NEFC samples with regard to sediments with decreasing particle size is as follows: 4% of the samples and 3% of the specimens occurred in sand-shell; 37% of the samples and 22% of the specimens in sand; one-third (33%) of the samples and 21% of the specimens occurred in silty sand; 11% of the samples and 21% of the specimens occurred in silt; while 15% of the samples and 34% of the specimens occurred in clay substrates (Table 295).

Periploma leanum (Conrad 1830).[11] Lea's spoon clam. Figure 86.

Lea's spoon clam is distributed from the Gulf of St. Lawrence and Nova Scotia to off North Carolina (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Abbott 1974; Emerson et al. 1976).

Periploma leanum is an uncommon to fairly common bivalve; there are 60 specimens of this species from 27 samples in the NEFC Specimen Reference Collection (Table 5).

Our specimens are from the continental shelf off the coast of Maine, in the Cape Cod region, and the offshore continental shelf and slope waters south of Nantucket Shoals (Fig. 86, Theroux and Wigley footnote 4, table 149).

The main distribution of this species is in the Boreal and Virginian provinces (Coomans 1962; Gosner 1971).

The depth range of this species extends from just offshore in moderately shallow water to approximately 29 m (Johnson 1934; Abbott 1974).

Our samples are from depths which range between 1 and 135 m with a mean of 48 m. The abundance of samples and specimens with regard to depth range groupings is as follows: 33% of the samples and 30% of the specimens are in the 0-24 m grouping; 26% of the samples and 38% of the specimens in the 25-49 m grouping; 26% of the samples and 22% of the specimens in the 50-99 m grouping and 15% of the samples and 10% of the specimens in the 100-199 m grouping (Table 296).

The samples yielding our specimens occurred in four sediment types. The majority of samples and specimens occurred in sand substrates which contained 46% of the samples and 61% of the specimens; sand-gravel substrates contained 23% of the former and 18% of the latter, while silty sand sediments contained 18% of the samples and 10% of the specimens; clay was the only other sediment type in which these organisms were found and it contained 14% of the samples and 10% of the specimens (Table 297). There are 5 samples containing 11 specimens which are unclassified with regard to sediment type.

[11]Abbott (1974) has "(Conrad, 1831)" for this species, it should be (Conrad 1830), see under References.

Periploma papyratium (Say 1822). Paper spoon clam. Figure 87.

The paper spoon clam is distributed from Labrador to Rhode Island and from South Carolina to the Gulf of Mexico (Johnson 1934; Clarke 1962; Morris 1973; Abbott 1974).

Periploma papyratium is a moderately common bivalve which is normally found in the northern reaches of the study area as reflected by the abundance of samples and specimens in the NEFC collection. *Periploma papyratium* is represented by 2,976 specimens, nearly 3% of the entire collection, from 265 samples, again, nearly 3% of the entire collection (Table 5).

Samples in the NEFC collection range from the Nova Scotian shelf, along the inner edge of the Gulf of Maine extending out towards the northern edge of Georges Bank and south onto the Southern New England shelf area and the Middle Atlantic Bight region (Fig. 87; Theroux and Wigley footnote 4, table 150).

The paper spoon clam inhabits the Boreal and Virginian provinces (Coomans 1962); Gosner (1971) placed it only in the Boreal province.

The published depth range for this species is from 1.8 to 2,297 m (Clarke 1962; Abbott 1974).

The NEFC samples range in depth from 7 to 458 m with a mean of 121 m. In terms of distribution among the depth range groupings there is a general tendency for a decrease in abundance with both increasing and decreasing depth range grouping from the 50-99 m grouping which contains 49% of the samples and 69% of the specimens; next greatest abundance occurs in the 100-199 m grouping with 25% of the samples and 14% of the specimens; the 25-49 m and the 0-24 m groupings each contain 8 and 1% of the samples, respectively, and 10 and 1% of the specimens, respectively, while the 200-499 m grouping contains 17% of samples and 7% of the specimens (Table 298).

The finer grained substrates contained significantly greater amounts of both samples and specimens of this species than the coarser ones. In order of decreasing particle size, abundance is as follows: gravel contained 1% of the samples and 0.4% of the specimens; sand-gravel, 2% for samples and 9% for specimens; till, 8% for samples and 14% for specimens; sand-shell substrates had traces of both, 0.4% samples and 0.1% specimens, while sand contained 23% for samples and 8% of the specimens; silty sand substrates accounted for 28% of the samples and 26% of the specimens; silt contained 10% of the samples and 12% of the specimens; and clay substrates contained the largest amounts, 29% of the samples and 31% of the specimens (Table 299). There is one sample containing one specimen which is unclassified with regard to sediment type.

Periploma sp. Figure 88.

There are four specimens from four samples in the NEFC collection which bear the classification *Periploma* sp. (Table 5).

Samples containing members of this genus are from the Gulf of Maine, the southern part of Georges Bank, and the Southern New England shelf area (Fig. 88; Theroux and Wigley footnote 4, table 151).

Our samples are from depths which range from 59 to 232 m with a mean of 117 m. The 50-99 m depth range grouping

contains 75% of the samples and 75% of the specimens, and the 200-499 m grouping contains 25% of each (Table 300).

Fifty percent of both samples and specimens occurred in two substrate types: sand and silty sand (Table 301).

Family THRACIIDAE

Our collection contains 36 specimens from 19 samples which are classified at the familial level Thraciidae (Table 5).

Samples containing members of this family are from the inner and outer continental shelf ranging between the mouth of Delaware Bay south to slightly north of Jacksonville, Fla. (Fig. 107; Theroux and Wigley footnote 4, table 194).

Our samples are from depths which range between 13 and 365 m with a mean of 68 m. The 0-24 m depth range grouping contains 37% of the samples and 33% of the specimens; the 25-49 m grouping contains 26% of the samples and 25% of the specimens; the 50-99 m grouping contains 21% of the samples and 25% of the specimens; the 100-199 m grouping is one exception with low quantities, containing 5% of the samples and 3% of the specimens, while the 200-499 m grouping contains 11% of the samples and 14% of the specimens (Table 302).

Three sediment types yielded samples which contained members of this family with sand containing the majority, 74% of samples and 78% of the specimens; sand-shell substrates contained 16% of samples and 8% of the specimens, while silty sand substrates contained 11% of the samples and 14% of the specimens (Table 303).

Genus *Thracia* Leach 1823

Thracia conradi Couthouy 1839.[12] Conrad's thracia. Figure 106.

The geographic range of this species is from the Canadian Maritime Provinces to North Carolina (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1968, 1974; Morris 1973).

Thracia conradi is fairly common and oftentimes frequently encountered; the NEFC collection contains 10 specimens from 6 samples of this species (Table 5).

Our samples are distributed from slightly south of Grand Manan Island off the coast of Maine to slightly north and east of the mouth of Delaware Bay (Fig. 106; Theroux and Wigley footnote 4, table 191).

This species occupies the Boreal and Virginian provinces (Coomans 1962); Dance (1974) placed it in the Boreal and Transatlantic provinces.

Conrad's thracia ranges from just below the low water mark to approximately 275 m (Abbott 1968, 1974; Morris 1973).

Our samples are from water depths which range between 34 and 126 m with a mean of 70 m. The majority of both samples and specimens are in the 0-24 m depth range grouping, which contains 50% of the samples and 70% of the specimens, while the 50-99 m grouping contains 33% of the samples and 20% of the specimens; smallest amounts are in the 25-49 m depth range grouping which contains 17% of the samples and 10% of the specimens (Table 304).

[12]Abbott (1974) has "Couthouy, 1838" for this species, it shold be Couthouy 1839, see under References.

Specimens of *T. conradi* were found in four sediment types; 33% of the samples occurred in both silty sand and silt and 17% of the samples occurred in till and sand. The distribution of specimens, however, differed in each sediment type with silt containing 40%, till, 30%, silty sand, 20%, and sand, 10% of the specimens (Table 305).

Thracia myopsis Möller 1842. Figure 107.

This species, which is widely distributed throughout Arctic regions ranges south to the Massachusetts coast (Johnson 1934; La Rocque 1953; Ockelmann 1958; Abbott 1974).

This uncommon bivalve is represented in the NEFC collection by six specimens from three samples (Table 5).

One of the three samples in the NEFC collection was from Browns Bank, another from east of Cape Ann, Mass., and the third at the tip of Cape Cod, Mass. (Fig. 107; Theroux and Wigley footnote 4, table 192).

Ockelmann (1958) reported that this species is panarctic in the American sector only.

The depth range for this species according to Johnson (1934), Ockelmann (1958), and Abbott (1974), is between 2 and 350 m.

Our samples are from water depths which range between 95 and 114 m with a mean of 105 m. The 50-99 m and 100-199 m depth range groupings each contain 50% of the samples while the former contains 60% and the latter 40% of the specimens. There is one sample containing one specimen which does not have any depth information in the sampling data.

Two of the samples containing five specimens were found in gravel substrates. One sample containing one specimen is unclassified with regard to sediment type.

Thracia septentrionalis Jeffreys 1872. Northern thracia. Figure 107.

The northern thracia is widely distributed throughout Arctic regions and ranges from Greenland south to Block Island, R.I. (Johnson 1934; La Rocque 1953; Ockelmann 1958; Morris 1973; Abbott 1974).

Thracia septentrionalis is represented in the NEFC collection by 46 specimens from 13 samples (Table 5).

Our samples are from the Georges Bank region and the surrounding offshore waters of Cape Cod, Mass. (Fig. 107; Theroux and Wigley footnote 4, table 193).

Gosner (1971) placed this species in the Boreal zoogeographic province and Ockelmann (1958) reported that it is panarctic in the North Atlantic.

The northern thracia occupies water depths which range between 9 and 113 m (Ockelmann 1958).

Our samples are from depths which range between 23 and 74 m with a mean of 54 m. In terms of depth range groupings there is a diminution of both sample and specimen abundance with decreasing depth range from 50-99m. The majority of both samples and specimens are in the 50-99 m depth range grouping which contains 62% of the samples and 74% of the specimens, while the 25-49 m grouping contains 31% of the former and 22% of the latter; the 0-24 m depth range grouping contains the smallest amount of both samples and specimens with 8% of the former and 4% of the latter (Table 306).

Our samples of the northern thracia were found in two sediment types with the majority of them occurring in sand

which contained 92% of the samples and 93% of the specimens. The only other sediment type in which specimens were found was sand-gravel which contained 8% of the samples and 7% of the specimens (Table 307). There is one sample containing one specimen which is unclassified with regard to sediment type.

Family POROMYIDAE
Genus *Poromya* Forbes 1844

***Poromya* sp. Figure 91.**

The NEFC collection contains six specimens from six samples which are classified as *Poromya* sp. (Table 5).

The samples containing specimens of *Poromya* are distributed on the edge of the continental shelf with two samples occurring between Delaware and Chesapeake Bays; two samples, one north and one south of Cape Hatteras, N.C., and two between Charleston, N.C., and Jacksonville, Fla. (Fig. 91; Theroux and Wigley footnote 4, table 159).

Our samples are from depths which range between 17 and 400 m with a mean of 131 m. The 0-24 and the 200-499 m groupings each contain 17% of both samples and specimens, while the 25-49 and 100-199 m groupings each contain 33% of both samples and specimens (Table 308).

Samples containing *Poromya* were obtained from three sediment types: sand-shell, sand, and silty sand. Sand substrates contained 50% of both samples and specimens, while sand-shell contained 17% for each and silty sand 33% for each (Table 309).

Family CUSPIDARIIDAE

There are 11 specimens from 9 samples in the NEFC collection classified as Cuspidariidae (Table 5).

Samples containing members of this taxon are from the continental shelf and upper slope in the southern regions of the study area extending from south of Cape Fear, N.C., to Key West, Fla. (Fig. 37; Theroux and Wigley footnote 4, table 60).

The depth range of our samples is 30 to 257 m with a mean of 156 m. The majority of samples and specimens are in the 200-499 m depth range grouping accounting for 45% of both samples and specimens. Two of the depth range groupings, the 50-99 m and the 100-199 m, each account for 22% of the samples but 18 and 23% of the specimens, respectively. The shallowest depth range grouping, 25-49 m, contains 11% of the samples and 9% of the specimens (Table 310).

This taxon was found in three sediment types, sand-shell, sand, and silty sand. Sand substrates predominate in both sample and specimen strength containing 56% of the former and 55% of the latter. One-third of the samples occurred in silty sand which contained 36% of the specimens; whereas, sand-shell substrates contained 11% of the samples and 9% of the specimens (Table 311).

Genus *Cardiomya* Adams 1864

***Cardiomya perrostrata* (Dall 1881). West Indian dipper shell. Figure 22.**

This species occurs from south of Martha's Vineyard, Mass., to the West Indies and Brazil (Johnson 1934; Morris 1973; Abbott 1974).

There are 24 specimens from 13 samples of this species in the NEFC collection (Table 5).

Our samples are distributed along the outer continental shelf and slope in the Middle Atlantic Bight Region between Cape Cod, Mass., and Cape Hatteras, N.C. (Fig. 22; Theroux and Wigley footnote 4, table 35).

The West Indian dipper shell occupies the Virginian province (Gosner 1971).

The depth range of this species is 106 to 761 m (Johnson 1934).

Our samples are from water depths ranging from 141 to 500 m with a mean of 212 m. The majority of both samples (77%) and specimens (88%) are in the 100-199 m depth range grouping; diminishing amounts of each occur in the 200-499 m and 500-999 m groupings (Table 312).

Members of this species were found in sand, silty sand, silt, and clay substrates. There is a general tendency of decreasing abundance of both samples and specimens with decreasing sediment particle size (Table 313).

Genus *Cuspidaria* Nardo (1840)

***Cuspidaria glacialis* (G. O. Sars 1878). Northern dipper shell. Figure 34.**

The northern dipper shell is widely distributed throughout the Northern Hemisphere, occurring in both the North Atlantic and North Pacific Oceans. Ockelmann (1958) and Clarke (1962) have extensive lists of its Arctic and subarctic distribution, claiming that it is panarctic but probably abyssal only in the North Atlantic. Other authorities report its distribution to be from Canadian Arctic seas south to Florida in the Atlantic and from Alaska to San Diego, Calif., in the Pacific (Johnson 1934; Morris 1951, 1973; La Rocque 1953; Abbott 1968, 1974).

The NEFC collection contains 184 specimens of this common species from 49 samples (Table 5).

Samples in our collection are primarily in the Gulf of Maine region; however, a few isolated samples occur in the Middle Atlantic Bight off Long Island, N.Y., a few off Atlantic City, N.J., and two occur farther south on the continental slope east of Norfolk, Va. (Fig. 34; Theroux and Wigley footnote 4, table 54).

The zoogeographic provinces occupied by this species are the Boreal and Virginian (Gosner 1971).

The reported depth range for this species is from 15 to 2,685 m (Johnson 1934; Clarke 1962; Abbott 1968).

The NEFC samples are from depths which range from 75 to 3,820 m with a mean of 281 m. The majority of our samples (55%) and specimens (60%) are in the 100-199 m depth range grouping; the 50-99 m and the 200-499 m groupings each contain 18% of the samples but 23 and 13% of the specimens, respectively. Six percent of the samples and 4% of the specimens are in the 500-999 m grouping and 2 and 0.5%, respectively, in the 2,000-3,999 m grouping (Table 314).

This species is an inhabitant of sand substrates (Abbott 1968).

Our samples were found in gravel, till, sand, silty sand, silt, and clay substrates. Table 315 lists the amounts of samples and specimens that were found in each sediment type. One sample containing three specimens is unclassified with regard to sediment type.

Cuspidaria obesa **(Lovén 1846). Obese dipper shell. Figure 35.**

The distribution of this species ranges from the Arctic Ocean to the West Indies in the northwest Atlantic (Johnson 1934; La Rocque 1953; Abbott 1974). Ockelmann (1958) and Clarke (1962) have compiled extensive lists of its distribution throughout Arctic regions as well as the European side of the North Atlantic showing it to range from Norway, western Europe, and the Canary Islands, south into the Mediterranean Basin.

This species is represented in the NEFC collection by 14 samples containing 30 specimens (Table 5).

Our samples are from the Gulf of Maine Basin and slope waters from Georges Bank to the offing of Delaware Bay (Fig. 35; Theroux and Wigley footnote 4, table 55).

This species is subarctic-boreal, Mediterranean-Atlantic, and abyssal (Ockelmann 1958).

This species inhabits water depths between 18 and 4,456 m (Clarke 1962).

Our samples are from depths ranging between 114 and 720 m with a mean of 401 m. The 200-499 m and the 500-999 m depth range groupings each contain 36% of the samples, but the former contains 23% and the latter 40% of the specimens. The other range grouping in which this species occurs is the 100-199 m grouping containing 29% of the samples and 37% of the specimens (Table 316).

Our samples were obtained from a variety of sediment types which included gravel, till, sand, silty sand, silt, and clay. The largest amount of samples (29%) were in silty sand; this substrate also contained the greatest number of specimens (37%). Other sediment types contained 7 to 21% of the samples and from 6 to 17% of the specimens (Table 317).

Cuspidaria parva **Verrill and Bush 1898. Figure 35.**

This species occurs off Cape Cod, Mass., in the North American Basin (Johnson 1934; Clarke 1962; Abbott 1974). The locations of our two samples are: 1) off the coast of Maine in the Gulf of Maine, and 2) on the continental slope between New York and Atlantic City, N.J. (Fig. 35; Theroux and Wigley footnote 4, table 56).

The reported depth range for this species is 90 to 2,361 m (Abbott 1974; Porter 1974).

There are three specimens from two samples of this rather rare bivalve species in the NEFC collection (Table 5).

The two samples in the NEFC collection are from 95 and 1,328 m of water. The shallower sample is in the 100-199 m depth range grouping and contains one specimen while the deep one is located in the 500-999 m depth range grouping and contains two specimens (Table 318).

One sample occurred in silt sediments and contained two specimens while the second sample was obtained from clay substrates and contained one specimen (Table 319).

Cuspidaria pellucida **Stimpson 1853. Figure 36.**

The geographic distribution of this species ranges from the Gulf of St. Lawrence to Casco Bay, Maine (Johnson 1934; La Rocque 1953; Abbott 1974); Ockelmann (1958) reported it to occur from Newfoundland to Cape Cod, Mass.

This rather rare species is represented in the NEFC collection by 19 specimens from 4 samples (Table 5).

Our samples are from off the coast of Maine on the continental shelf and from the Gulf of Maine Basin proper (Fig. 36; Theroux and Wigley footnote 4, table 57).

The bathymetric range of this species is from 73 to 174 m (Abbott 1974).

Our samples range in depth from 75 to 178 m with a mean of 123 m. Seventy-five percent of the samples and 74% of the specimens are in the 100-199 m depth range grouping and 25% of the samples and 26% of the specimens are in the 50-99 m depth range grouping (Table 320).

Sixty-seven percent of the samples and 36% of the specimens occurred in silty sand substrates (Table 321). One sample containing five specimens is unclassified with regard to sediment type.

Cuspidaria rostrata **(Spengler 1793). Rostrate cuspidaria. Figure 36.**

This species is reported to occur from Arctic seas to the West Indies in the North Atlantic and is also found in Europe (Johnson 1934; La Rocque 1953; Morris 1973; Abbott 1974). Ockelmann (1958), Clarke (1962), and Tebble (1966) have complete lists of its Arctic and subarctic distribution as well as its European distribution. Tebble mentioned that it is also present in the Mediterranean, along the Atlantic coast of Morocco, in the Canary Islands, the Azores, and Sierra Leone and Liberia on the African coast.

This is a moderately common bivalve of which there are two samples containing nine specimens in the NEFC Specimen Reference Collection (Table 5).

Our samples are from the edge of the continental shelf south of Georges Bank (Fig. 36; Theroux and Wigley footnote 4, table 58).

The rostrate cuspidaria is a deep water species which ranges from 64 to 2,999 m in depth (Johnson 1934; Clarke 1962).

The NEFC samples are from depths ranging from 121 to 144 m with a mean of 133 m. This depth range places both samples in the 100-199 m depth range grouping.

The two samples which yielded specimens of the rostrate cuspidaria were obtained in a sand substrate.

Cuspidaria **sp. Figure 37.**

There are 114 specimens from 69 samples which are identified to the generic level *Cuspidaria* in the NEFC collection (Table 5).

The 69 samples containing members of the genus *Cuspidaria* are distributed in two groupings within the study area. The first group ranges from the Gulf of Maine Basin south to the outer banks of Cape Cod, Mass.; the second is a more deeply distributed group of samples on the continental shelf and slope, ranging from the middle part of southern Georges Bank to the offing of Chesapeake Bay (Fig. 37; Theroux and Wigley footnote 4, table 59).

Our samples are from water depths which range from 44 to 2,035 m with a mean of 331 m. The majority of samples are in the 100-199 m depth range grouping which contains 49% of the samples and 55% of the specimens. Next largest amounts are in the 200-499 m depth range grouping accounting for 39 and 30% for samples and specimens, respectively; significantly lower amounts of both samples and specimens occur in the other depth range groupings (Table 322).

Specimens of *Cuspidaria* occurred in all but two of our nine sediment types, namely, shell and sand-shell. The greatest numbers of samples and specimens occurred in clay which yielded 41% of the former and 45% of the latter; another sediment type which contained substantial amounts was silty sand accounting for 30% of the samples and 30% of the specimens; sand yielded 11% of the samples and 11% of the specimens with smaller amounts of samples and specimens occurring in the remaining sediment types (Table 323). There are three samples containing eight specimens which are unclassified with regard to sediment type.

Genus *Plectodon* Carpenter 1864

***Plectodon* sp. Figure 90.**

The NEFC collection contains six specimens from four samples which bear the generic designation *Plectodon* sp. (Table 5).

The samples containing this taxon are from the edge of the continental shelf in the Mid-Atlantic Bight region between Chesapeake Bay and Delaware Bay (Fig. 90; Theroux and Wigley footnote 4, table 156).

The range in depth for these four samples is 77 to 118 m with a mean of 100 m. Seventy-five percent of the samples and 83% of the specimens are in the 100-199 m depth range grouping with 25% of the former and 17% of the latter in the 50-99 m grouping (Table 324).

Two sediment types contained *Plectodon* specimens, these were sand-shell and sand; the former contained 75% of the samples and 83% of the specimens and the latter 25% of the samples and 17% of the specimens (Table 325).

Family VERTICORDIIDAE
Genus *Lyonsiella* Sars 1868

***Lyonsiella abyssicola* (G. Sars 1872). Figure 57.**

This species is reportedly found south of Martha's Vineyard, Mass., (Johnson 1934; Abbott 1974) but also occurs in northern Europe and in Arctic regions (Ockelmann 1958; Clarke 1962).

The NEFC collection contains one specimen from one sample of this rather rare bivalve species (Table 5).

Our sample is from slightly south of the northeast peak of Georges Bank at the juncture of the continental shelf and the upper portion of the continental slope (Fig. 57; Theroux and Wigley footnote 4, table 99).

Ockelmann (1958) reported that this species is panarctic-boreal and that it is abyssal in the North Atlantic only.

This species enjoys a wide bathymetric range occupying water depths between 37 and 2,654 m (Clarke 1962).

Our sample is from a water depth of 617 m which places it in the 500-999 m depth range grouping.

Our sample was obtained from a sand substrate.

***Lyonsiella* sp. Figure 57.**

Abbott (1974) noted that members of this genus are mostly very deep water inhabitants and that there are several Atlantic species. The NEFC collection contains one specimen from one sample (Table 5).

Our sample is from the continental slope adjacent to the entrance to Northeast Channel (Fig. 57; Theroux and Wigley footnote 4, table 100). It is from a water depth of 1,934 m in a silty sand substrate.

Genus *Verticordia* Gray 1840

***Verticordia ornata* (Orbigny 1842). Ornate verticord. Figure 117.**

This species occurs in both the Atlantic and Pacific Oceans; in the Atlantic it ranges from Massachusetts to Florida, and the West Indies, it also occurs at Bermuda and Brazil; in the Pacific Ocean it occurs from Catalina Island, Calif., south to Panama (Johnson 1934; Morris 1973; Abbott 1974).

This species is represented in our collection by eight specimens from seven samples (Table 5).

The NEFC samples are from the east coast continental shelf between Cape Fear, N.C., and the central section of the Florida Peninsula (Fig. 117; Theroux and Wigley footnote 4, table 208).

This species occupies the Virginian, Caribbean, and Carolinian zoogeographic provinces (Coomans 1962).

The ornate verticord enjoys a rather wide bathymetric range, occurring in water depths which range between 9 and 1,257 m (Johnson 1934; Abbott 1974).

Our samples are from water depths which range between 30 and 420 m with a mean of 148 m. The majority of both samples and specimens in our collection are in the 25-49 m depth range grouping which contains 57% of the samples and 63% of the specimens; the 200-499 m grouping contains 29% of the samples and 25% of the specimens, while the 100-199 m grouping contains 14% of the samples and 13% of the specimens (Table 326).

All of our samples yielding specimens of the ornate verticord were obtained in sand substrates (Table 327).

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Limopsis cristata 14
Limopsis minuta 14
Limopsis sp 14
Limopsis sulcata 14
Liocyma fluctuosa 46
listeri, Periglypta 47
lucida, Portlandia 10
Lucinidae 25
Lucinoma blakeana 25
Lucinoma filosa 25
Lucinoma sp 25
lunulata, Crassinella 35
Lyonsia arenosa 52
Lyonsia hyalina 53
Lyonsia sp 53
Lyonsiella abyssicola 58
Lyonsiella sp 58
Macoma balthica 40
Macoma calcarea 40
Macoma sp 41
Macoma tenta 41
magellanicus, Placopecten 22
Malletia obtusa 5
Mercenaria mercenaria 46
mercenaria, Mercenaria 46
Mesodesma arctatum 38
minuscula, Portlandia 11
minuta, Limopsis 14
mirabilis, Strigilla 41
Modiolus modiolus 17
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Montacuta sp 30
montagui, Astarte 34
morrhuanus, Pitar 47
mortoni, Laevicardium 36
Mulinia lateralis 37
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Musculus corrugatus 18
Musculus discors 18
Musculus niger 18
Musculus sp 19
Mya arenaria 48
myalis, Yoldia 7
myopsis, Thracia 55
Myrtea pristiphora 26
Mysella sp 30
Mytilidae 15
Mytilus edulis 19
nana, Astarte 34
nanus, Cyclopecten 21
Nemocardium peramabile 36
niger, Musculus 18
Noetia ponderosa 13
novangliae, Cyclocardia 31
Nucula delphinodonta 3
Nucula proxima 3
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Nucula sp 4
Nuculana acuta 5
Nuculana carpenteri 6
Nuculana caudata 6
Nuculana pernula 6
Nuculana tenuisulcata 6
Nuculana sp 7
Nuculanidae 5
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nuculoides, Semele 43
obesa, Cuspidaria 57
obtusa, Malletia 5
orbiculata, Axinopsida 26
ornata, Verticordia 58
Ostrea sp 24
ovalis, Anadara 12
Pandora bushiana 51
Pandora gouldiana 51
Pandora inflata 51
Pandora inornata 52
Pandora trilineata 52
Pandora sp 52
Panomya arctica 50

papyratium, Periploma 54
Papyridea semisulcata 37
parva, Cuspidaria 57
Parvilucina blanda 26
pectinata, Glycymeris 15
Pectinidae 20
pectunculoides, Bathyarca 13
pellucida, Cuspidaria 57
peramabile, Nemocardium 36
Periglypta listeri 47
Periploma affine 53
Periploma fragile 53
Periploma leanum 54
Periploma papyratium 54
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pernula, Nuculana 6
perplana, Pteromeris 32
perrostrata, Cardiomya 56
Petricola pholadiformis 47
pholadiformis, Petricola 47
phrygium, Aequipecten 20
pinnulatum, Cerastoderma 35
Pitar morrhuanus 47
Pitar sp 47
Placopecten magellanicus 22
plebeius, Tagelus 44
Plectodon sp 58
Pleuromeris tridentata 32
Plicatula gibbosa 23
polynyma, Spisula 37
ponderosa, Noetia 13
Poromya sp 56
Portlandia fraterna 9
Portlandia frigida 9
Portlandia inconspicua 9
Portlandia inflata 10
Portlandia iris 10
Portlandia lenticula 10
Portlandia lucida 10
Portlandia minuscula 11
pristiphora, Myrtea 26
Propeamussium thalassinum 22
proxima, Nucula 3
Pteromeris perplana 32
purpurascens, Semele 44
pustulosus, Cyclopecten 21
pygmaea, Thyasira 28
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Rangia cuneata 37
regularis, Yoldia 8
rostrata, Cuspidaria 57
sapotilla, Yoldia 8
Saturnia subovata 5
Semele bellastriata 43
Semele nuculoides 43
Semele purpurascens 44
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semisulcata, Papyridea 37
septentrionalis, Thracia 55
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siliqua, Cyrtodaria 49
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smithii, Astarte 34
Solemya borealis 11
Solemya velum 11
Solenidae 39
solidissima, Spisula 38
speciosa, Eucrassatella 35
Spisula polynyma 37
Spisula solidissima 38
Spondylus sp 23
squamula, Anomia 23
striata, Hiatella 50
Strigilla mirabilis 41
subauriculata, Limatula 24
subovata, Saturnia 5
subovata, Thyasira 28
sulcata, Limopsis 14
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Tellina aequistriata 41
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Tellina consobrina 42
Tellina versicolor 42
Tellina sp 42
Tellinidae 40
tellinoides, Cumingea 43
tenta, Macoma 41
tenuis, Nucula 4
tenuisulcata, Nuculana 6
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Thracia conradi 55
Thracia myopsis 55
Thracia septentrionalis 55
thraciaeformis, Yoldia 8
Thraciidae 55
Thyasira brevis 26
Thyasira croulinensis 26
Thyasira elliptica 27
Thyasira equalis 27
Thyasira ferruginea 27
Thyasira flexuosa 27
Thyasira flexuosa-gouldii 28
Thyasira pygmaea 28
Thyasira subovata 28
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Thyasira sp 29
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trisinuata, Thyasira 29
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Turtonia sp 30
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velum, Solemya 11
Veneridae 45
versicolor, Tellina 42
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virginica, Crassostrea 24
vitreum, Dacrydium 17
vitreus, Delectopecten 22
Xylophaga atlantica 51
Yoldia limatula 7
Yoldia myalis 7

Yoldia regularis 8
Yoldia sapotilla 8
Yoldia sp 9
Yoldia thraciaeformis 8

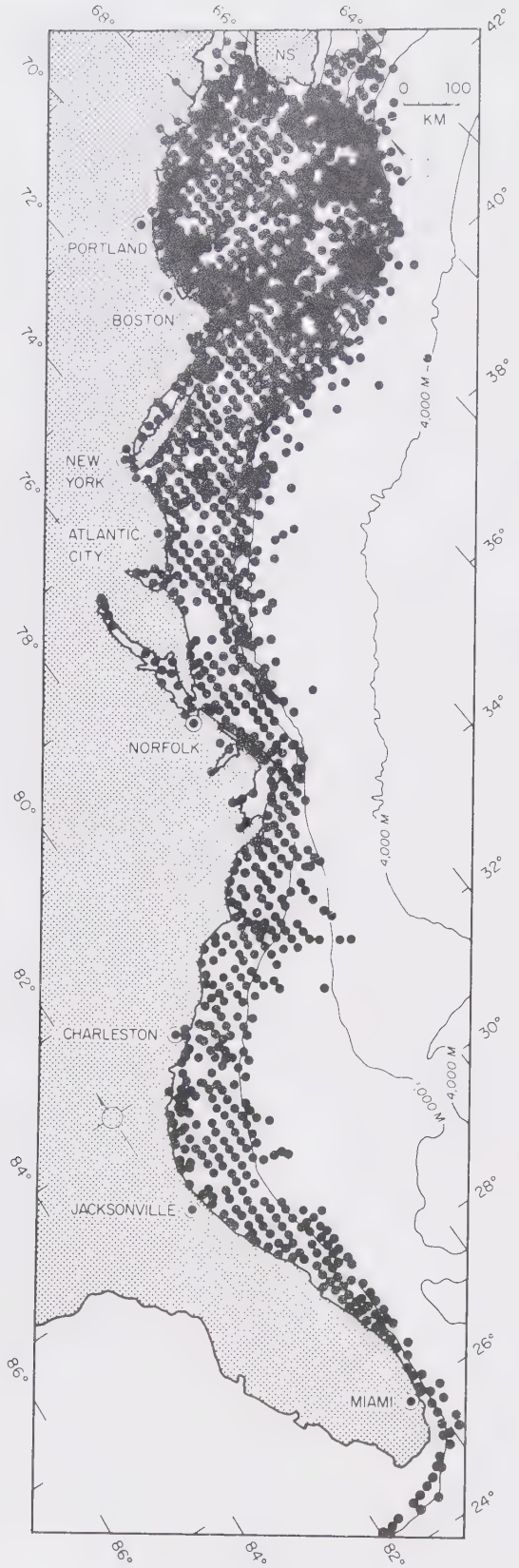

Figure 1.—Chart of U.S. east coast showing sampling locations for bivalve collection.

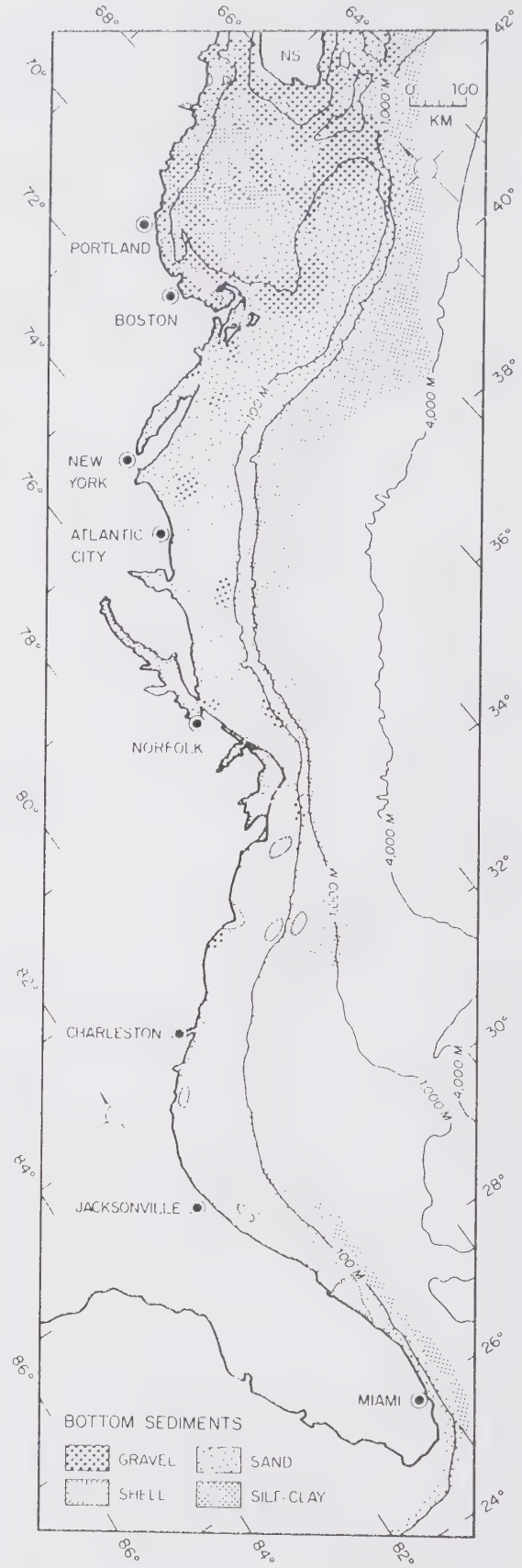

Figure 2.—Distribution of predominant bottom sediments.

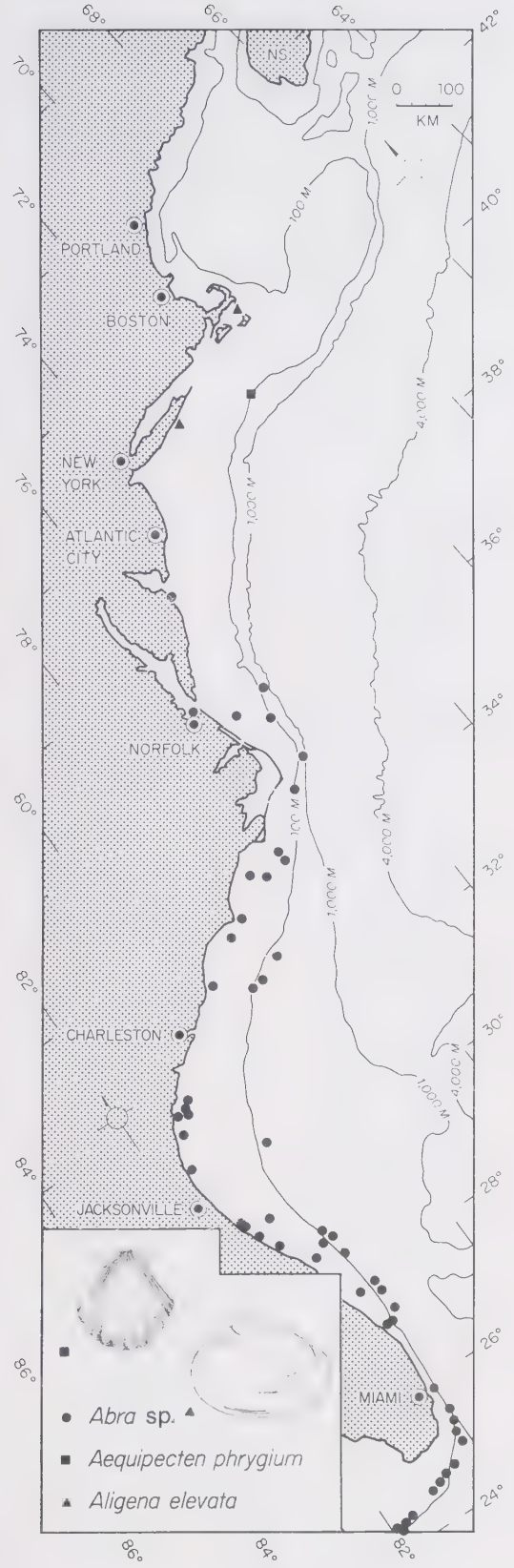

Figure 3.—Geographic distribution of *Abra* sp., *Aequipecten phrygium*, and *Aligena elevata*.

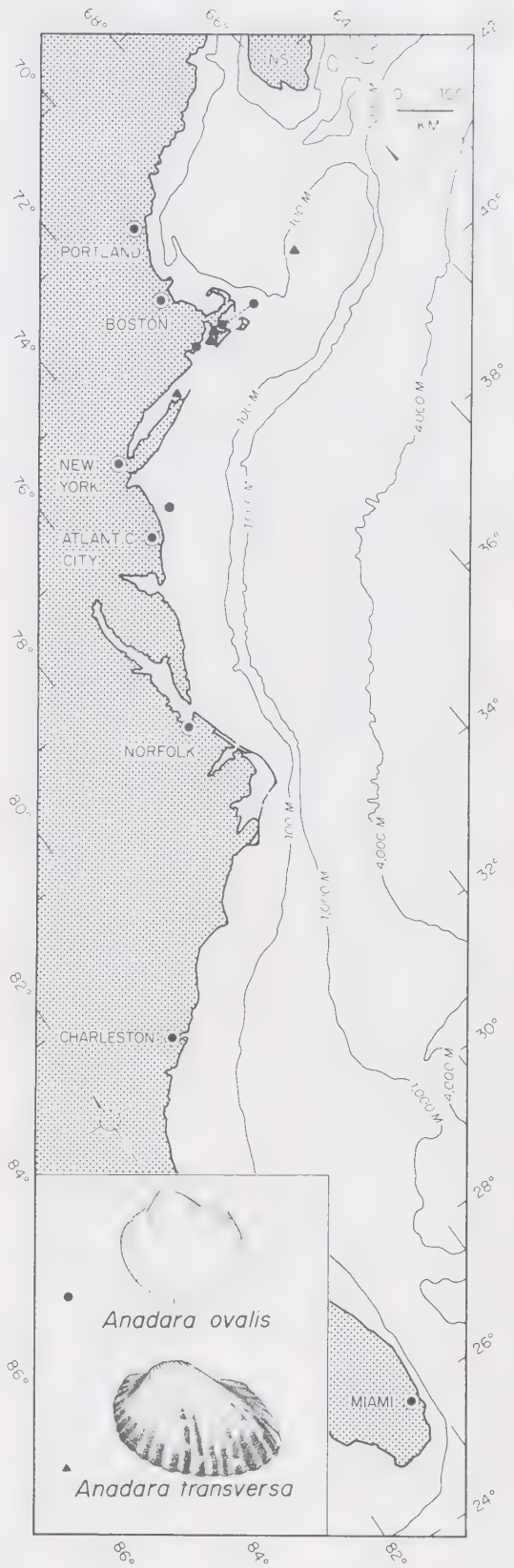

Figure 4.—Geographic distribution of *Anadara ovalis* and *Anadara transversa*.

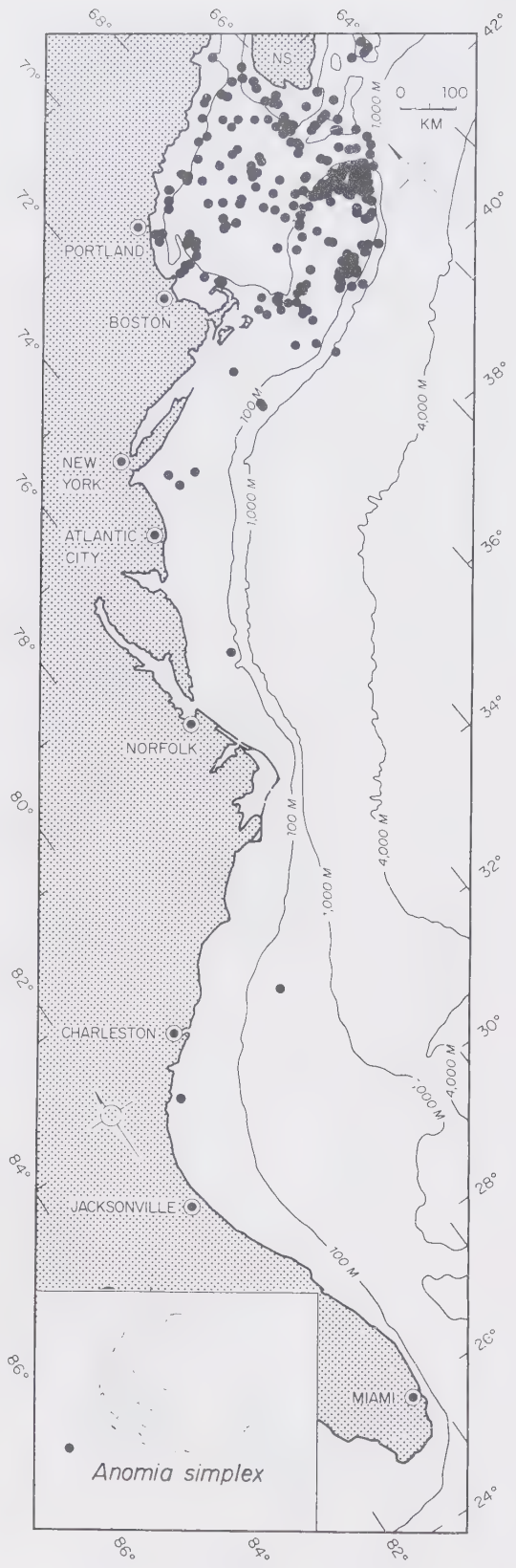

Figure 5.—Geographic distribution of *Anomia simplex*.

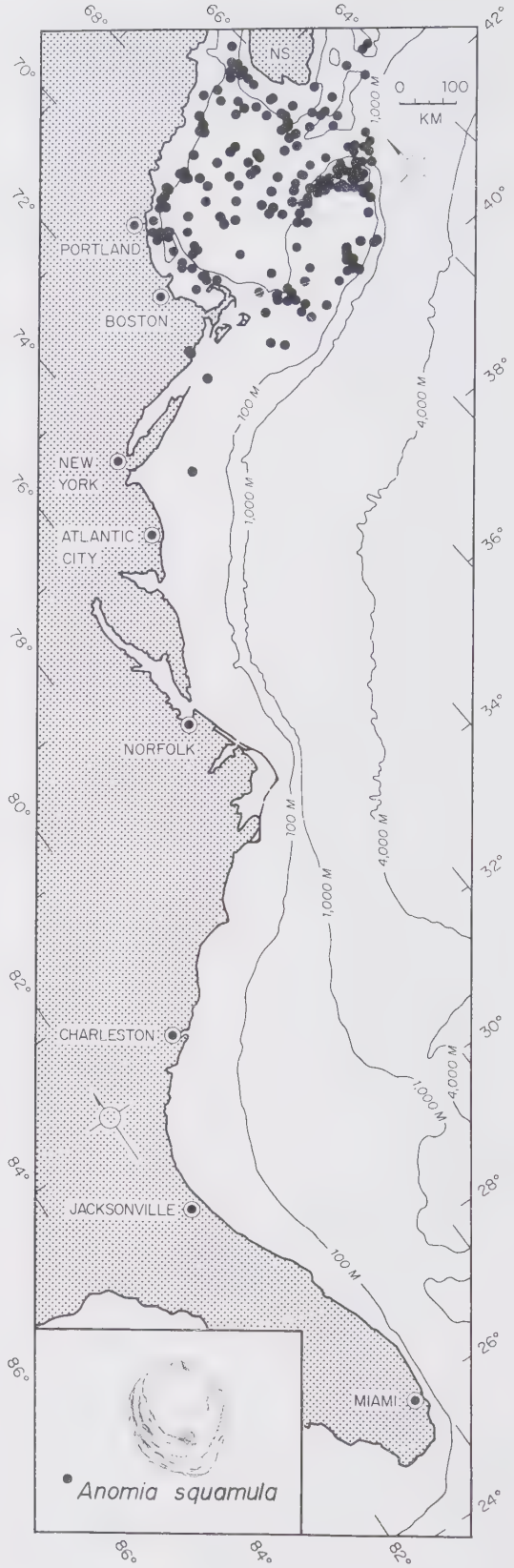

Figure 6.—Geographic distribution of *Anomia squamula*.

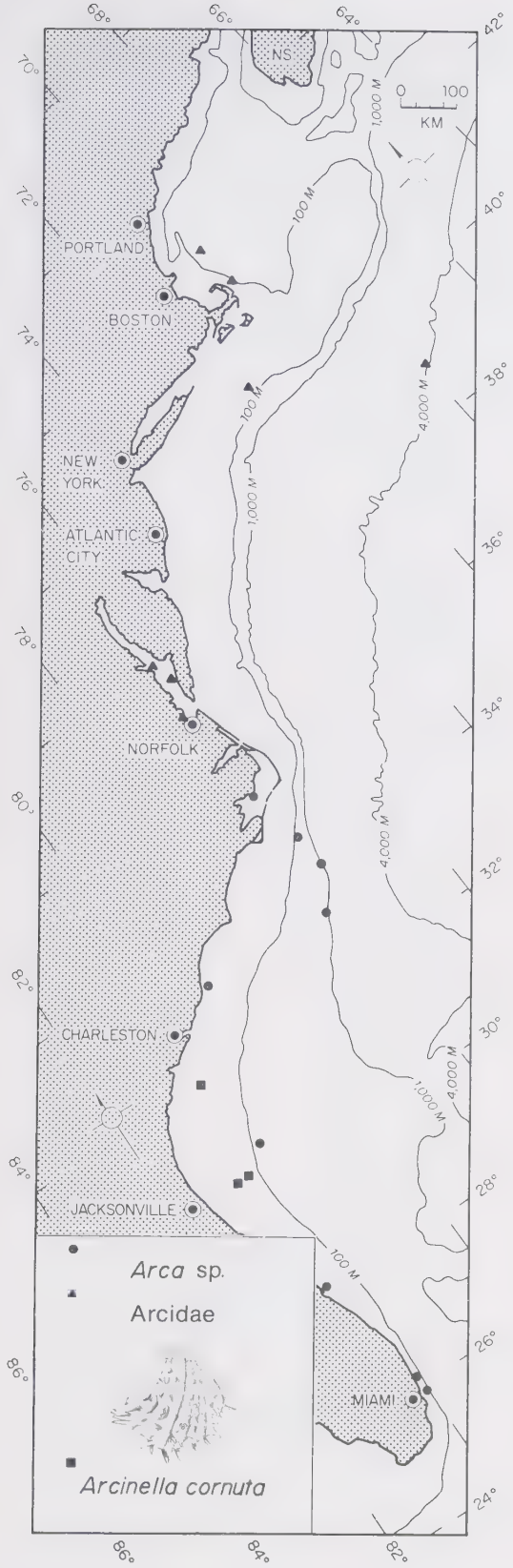

Figure 7.—Geographic distribution of *Arca* sp., Arcidae, and *Arcinella cornuta*.

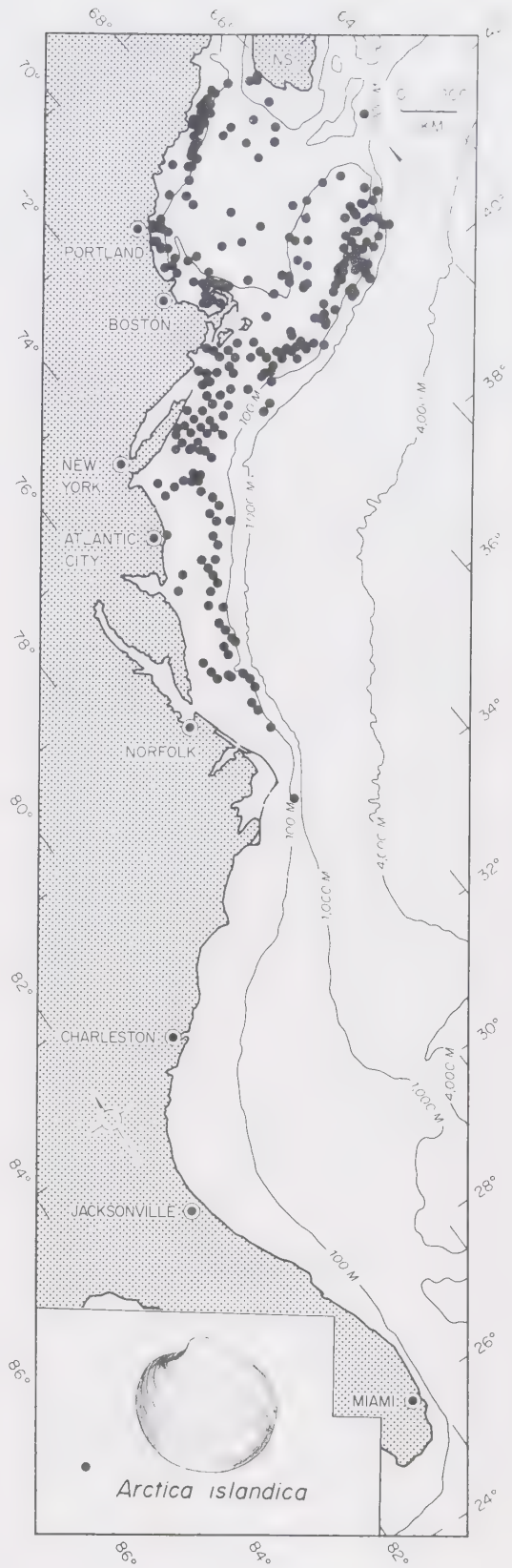

Figure 8.—Geographic distribution of *Arctica islandica*.

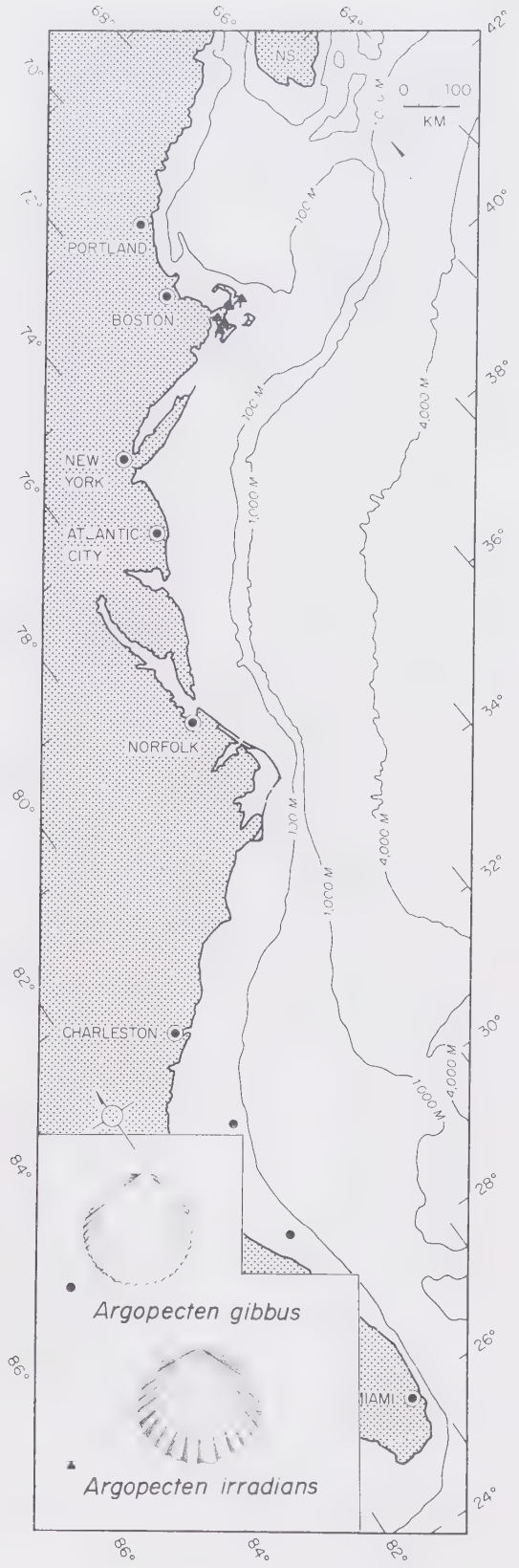

Figure 9.—Geographic distribution of *Argopecten gibbus* and *Argopecten irradians*.

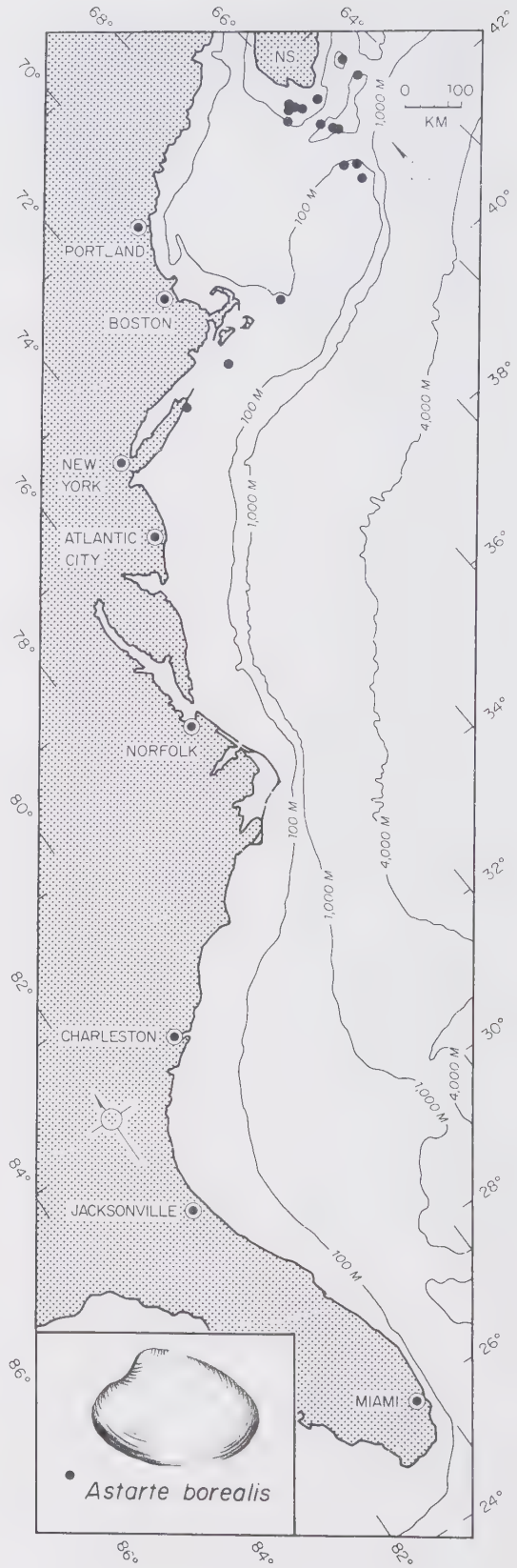

Figure 10.—Geographic distribution of *Astarte borealis*.

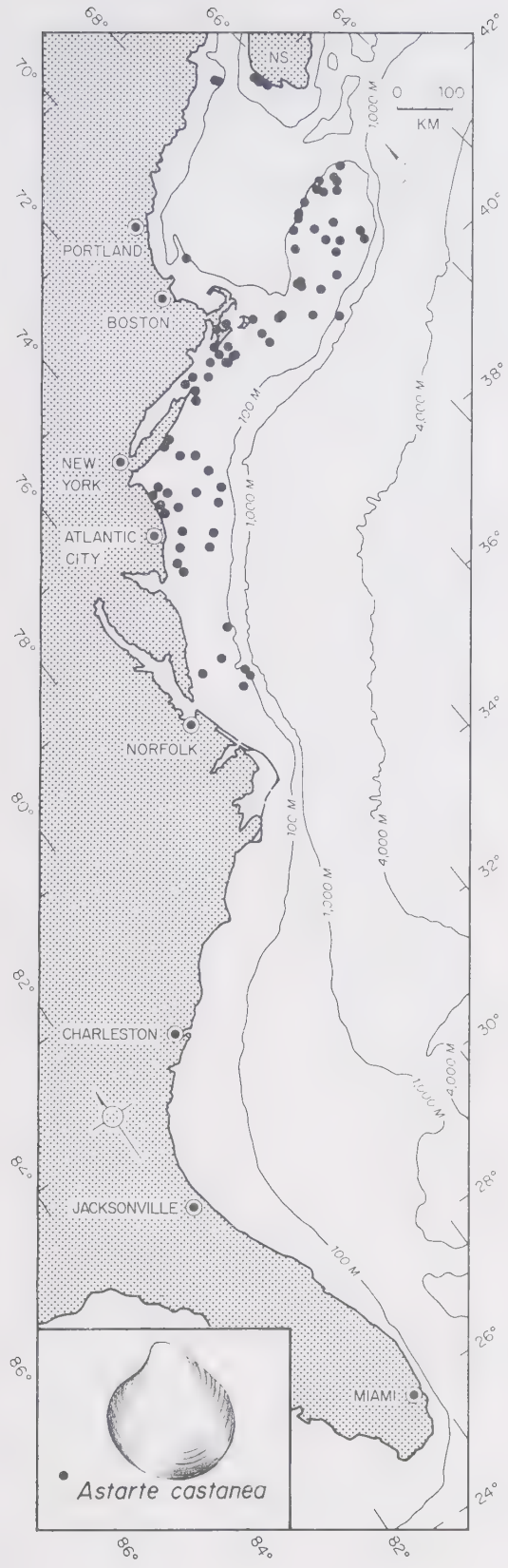

Figure 11.—Geographic distribution of *Astarte castanea*.

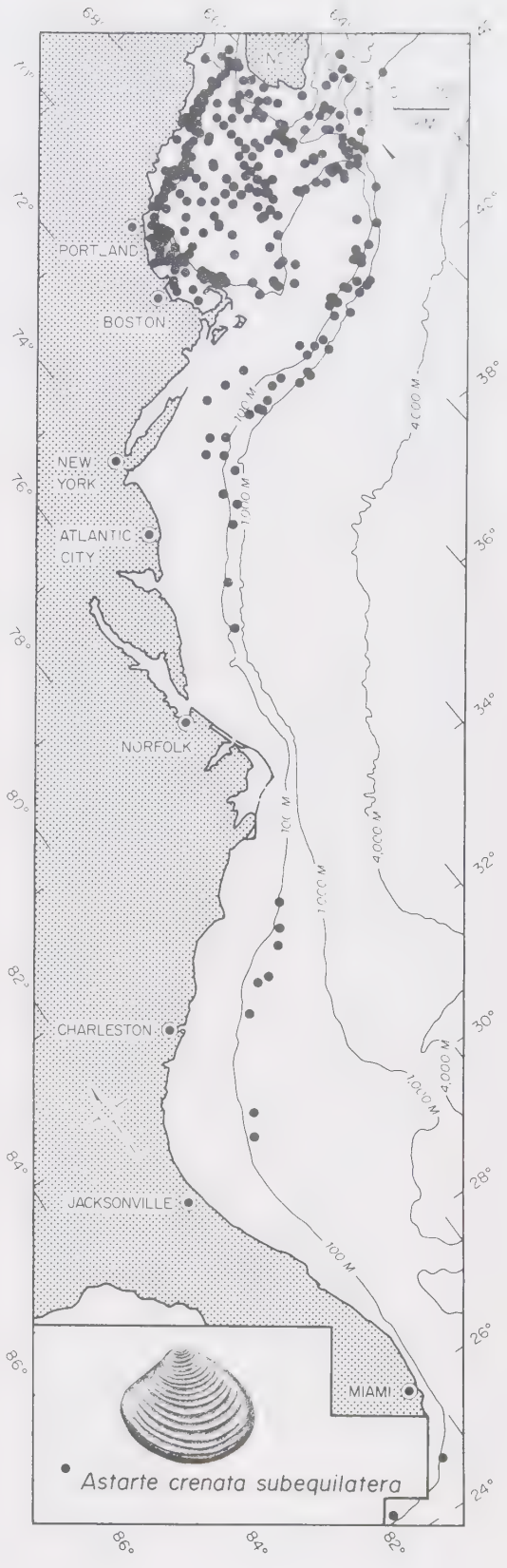

Figure 12.—Geographic distribution of *Astarte crenata subequilatera*.

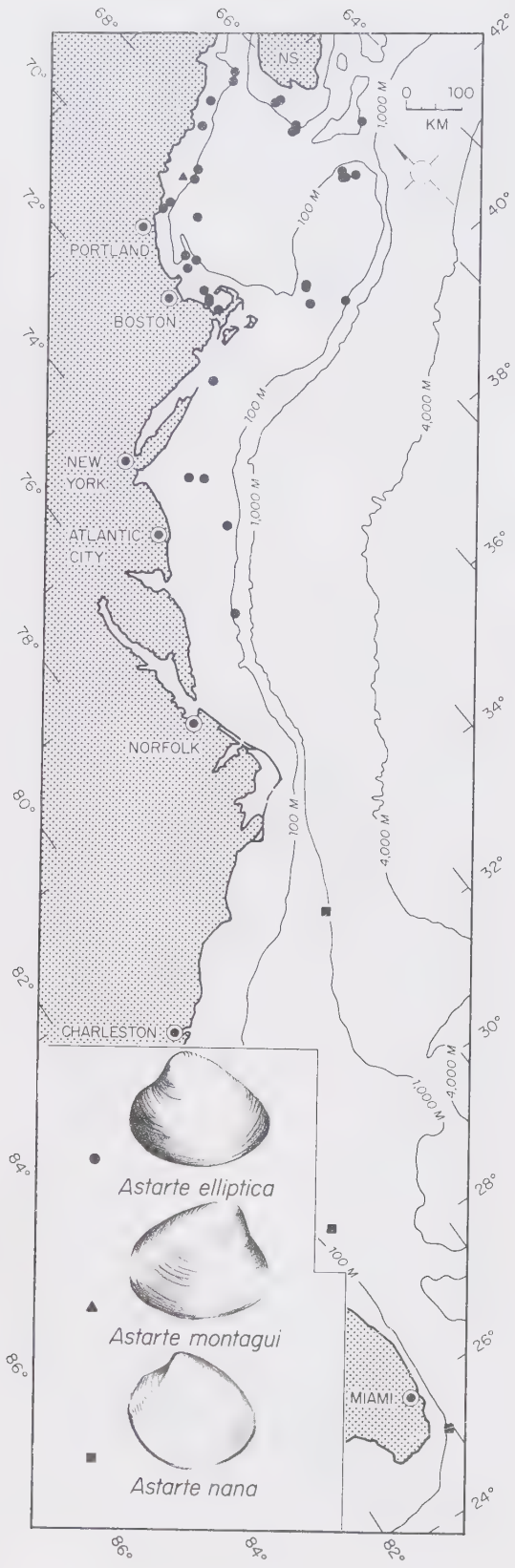

Figure 13.—Geographic distribution of *Astarte elliptica*, *Astarte montagui*, and *Astarte nana*.

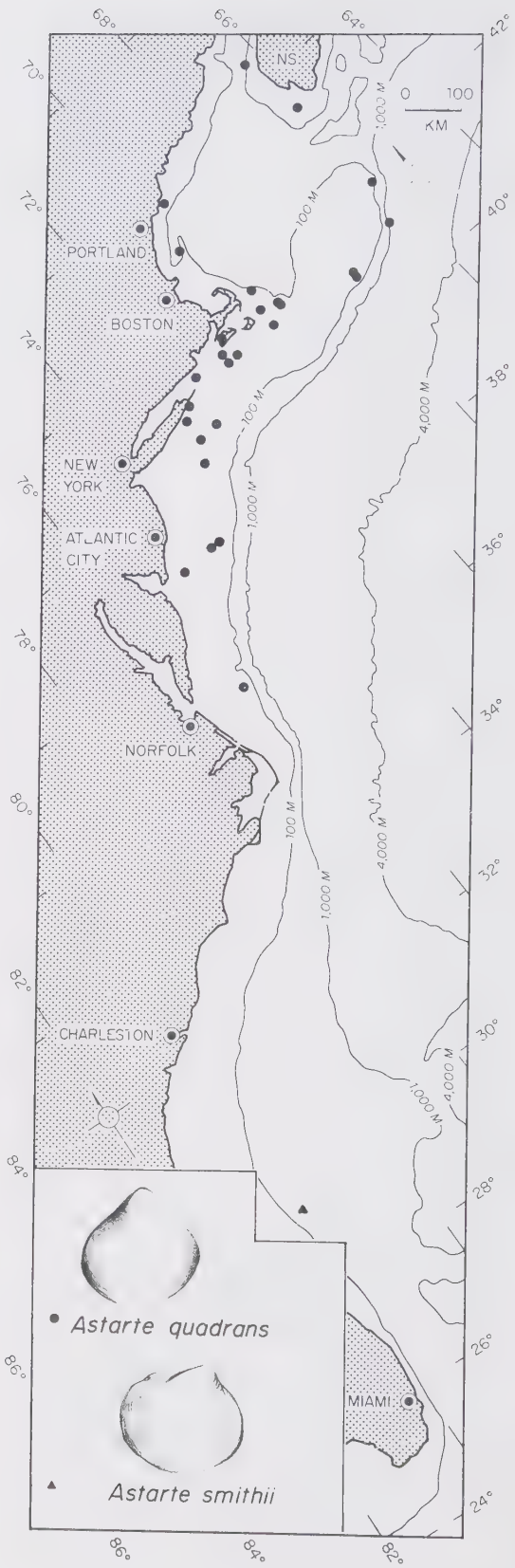

Figure 14.—Geographic distribution of *Astarte quadrans* and *Astarte smithii*.

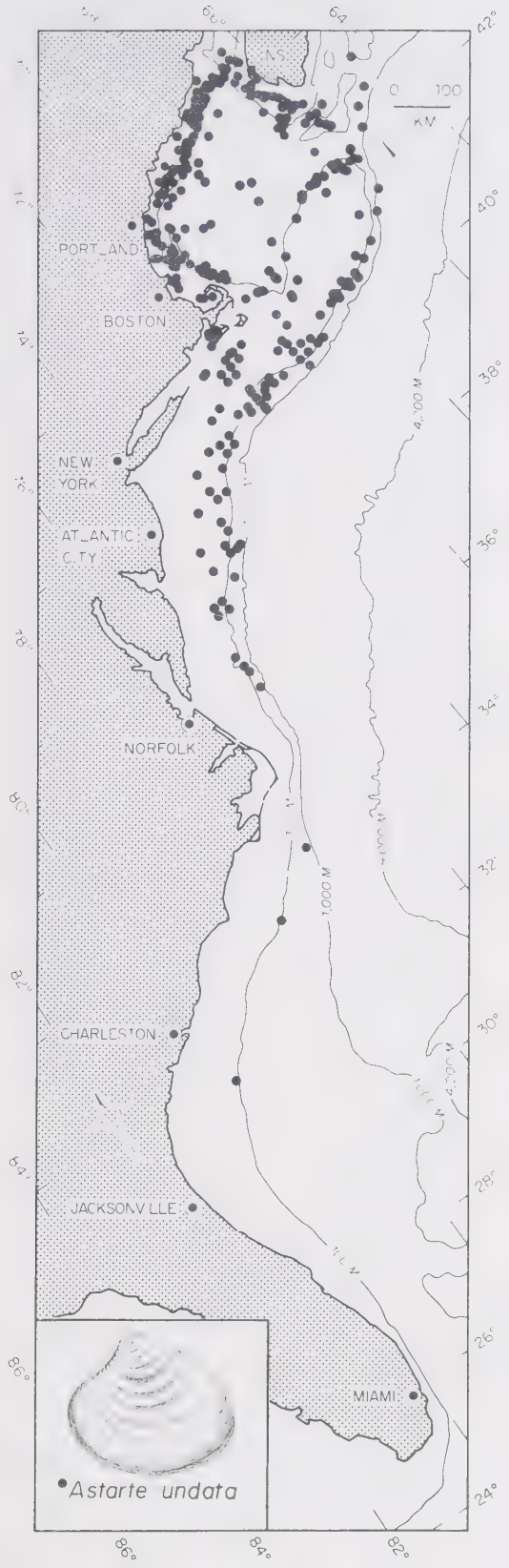

Figure 15.—Geographic distribution of *Astarte undata*.

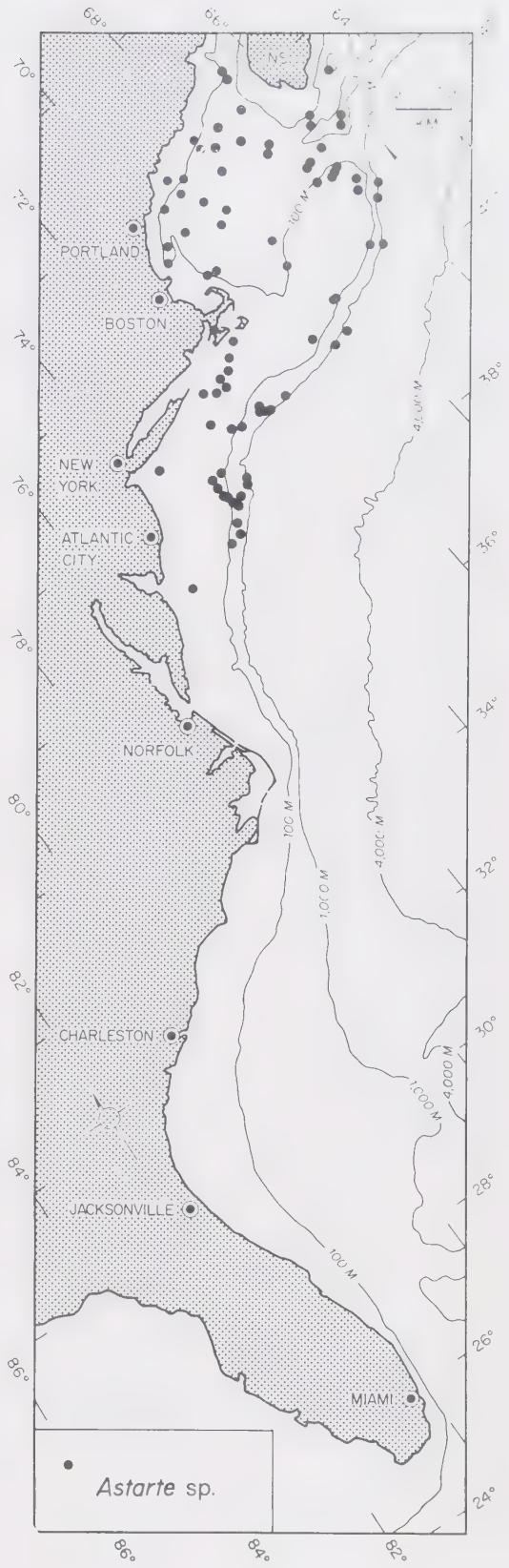

Figure 16.—Geographic distribution of *Astarte* sp.

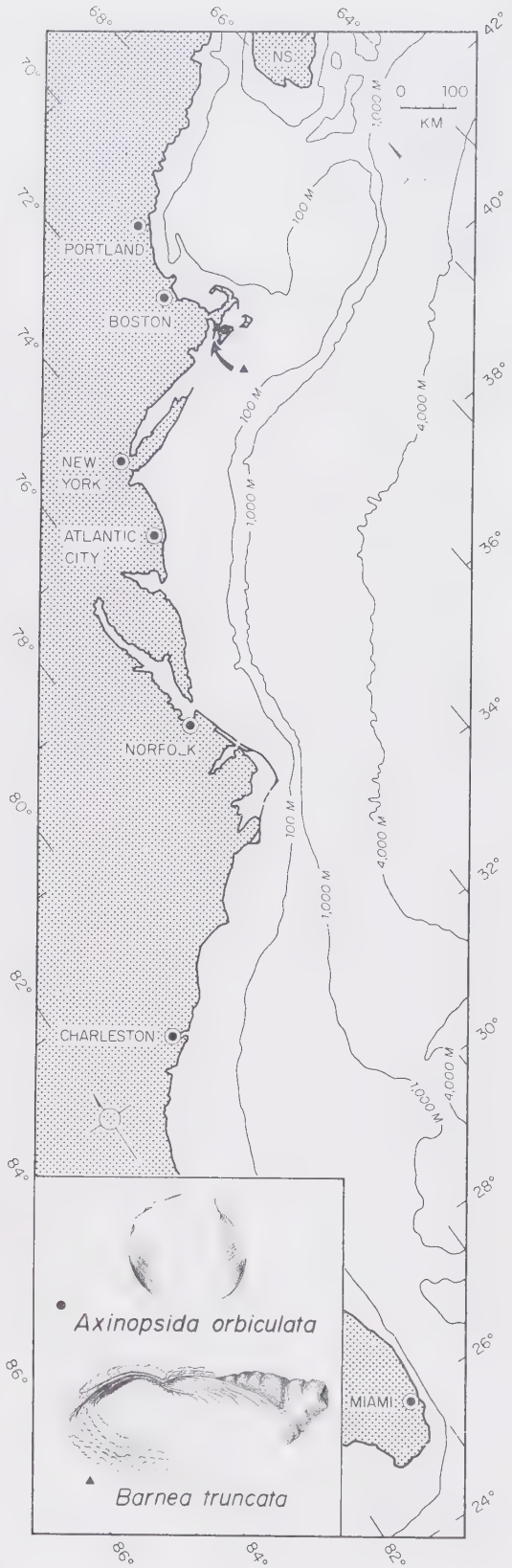

Figure 17.—Geographic distribution of *Axinopsida orbiculata* and *Barnea truncata*.

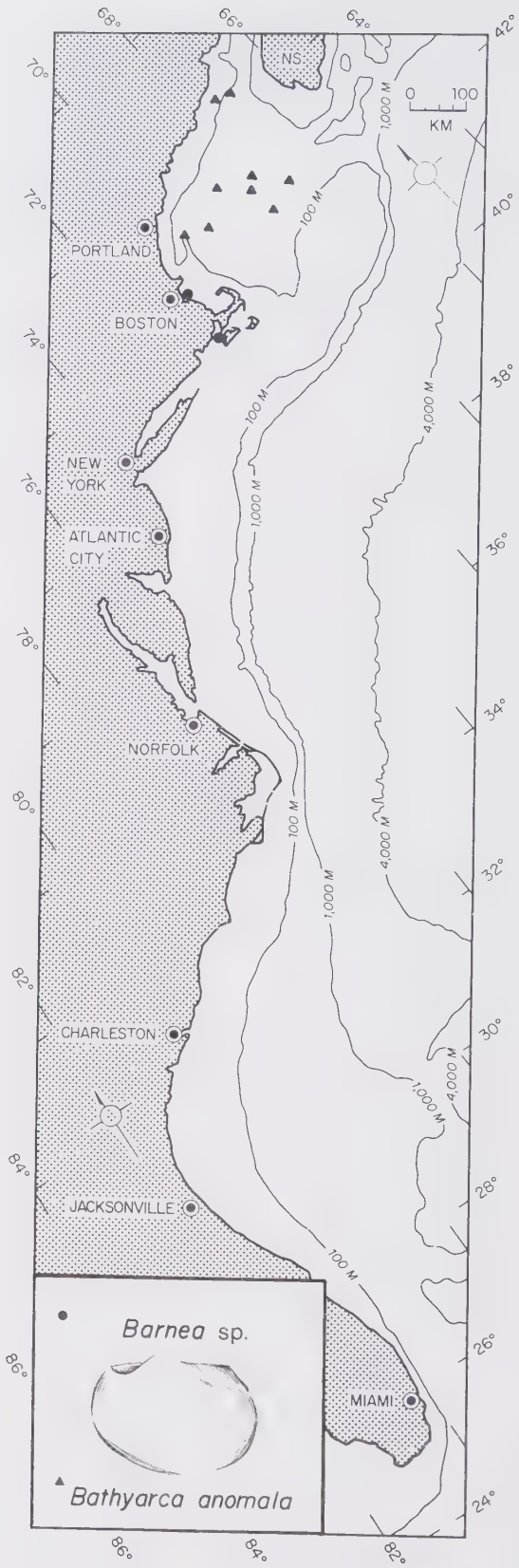

Figure 18.—Geographic distribution of *Barnea* sp. and *Bathyarca anomala*.

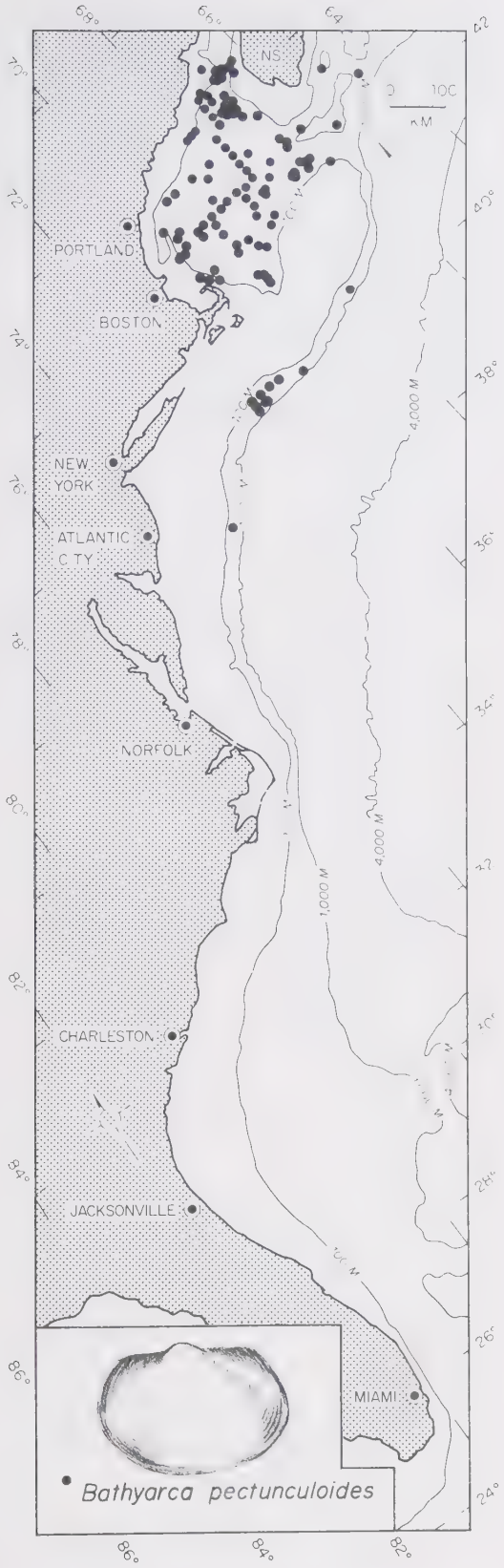

Figure 19.—Geographic distribution of *Bathyarca pectunculoides*.

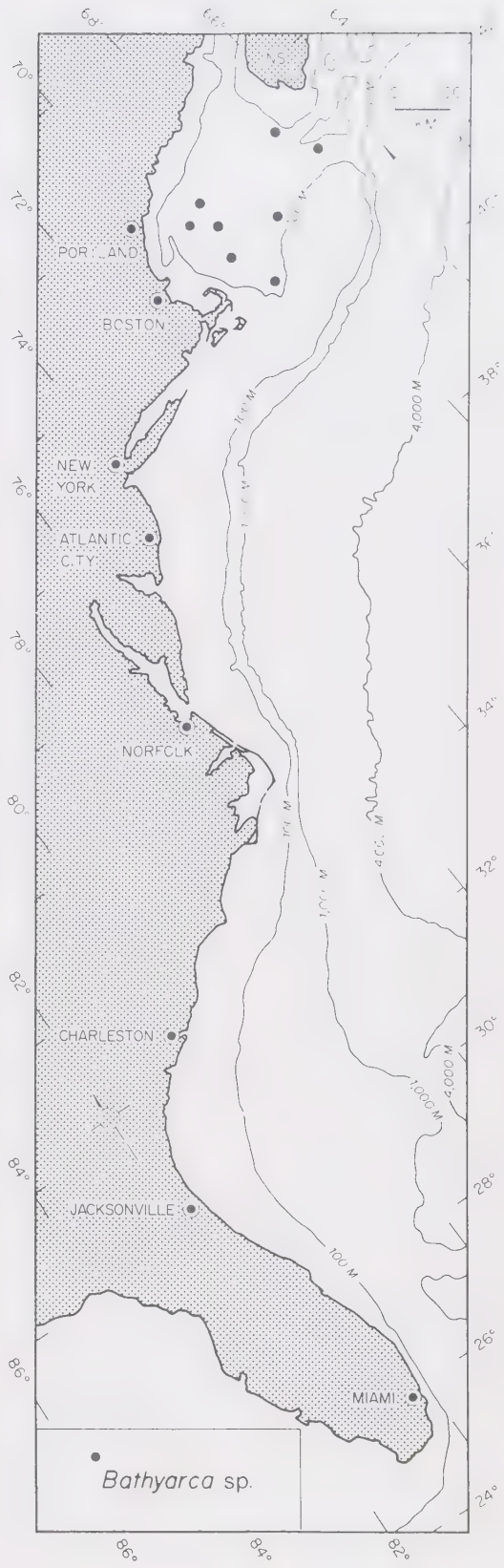

Figure 20.—Geographic distribution of *Bathyarca* sp.

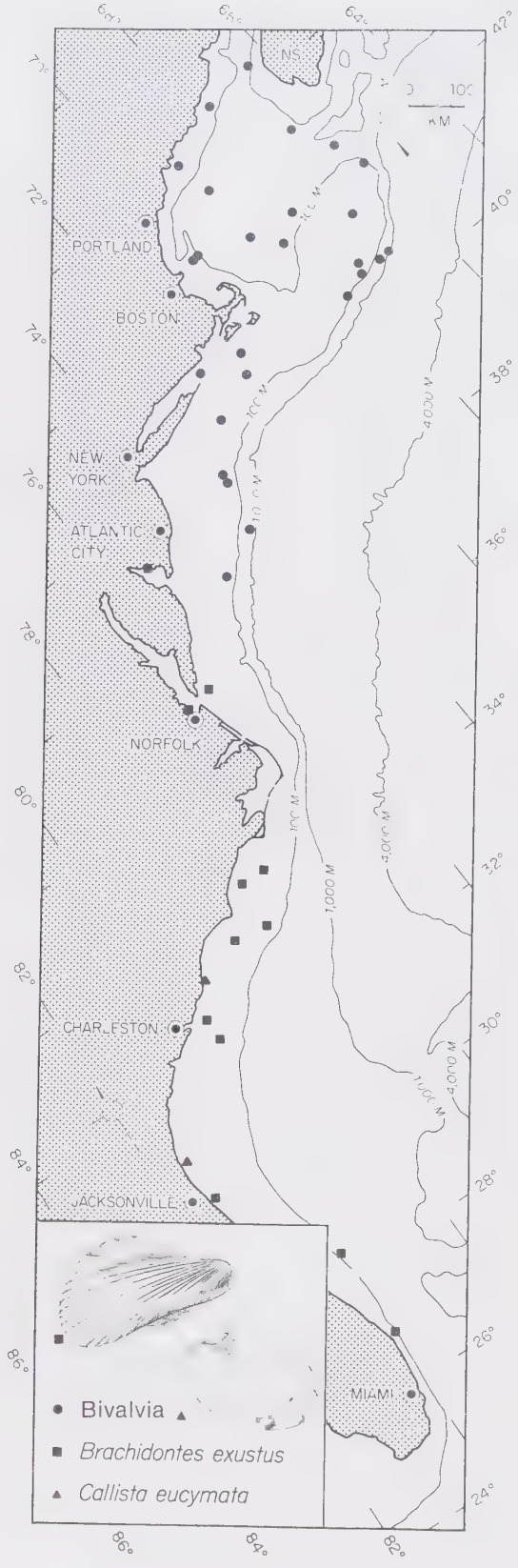

Figure 21.—Geographic distribution of Bivalvia, *Brachidontes exustus*, and *Callista eucymata*.

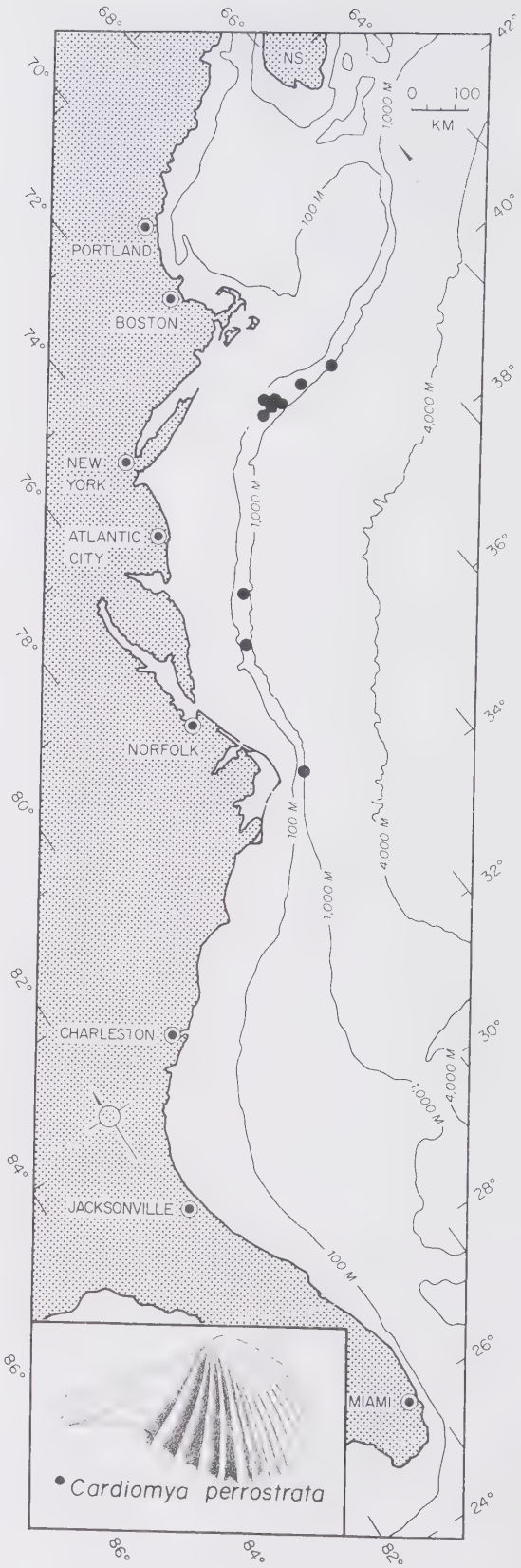

Figure 22.—Geographic distribution of *Cardiomya perrostrata*.

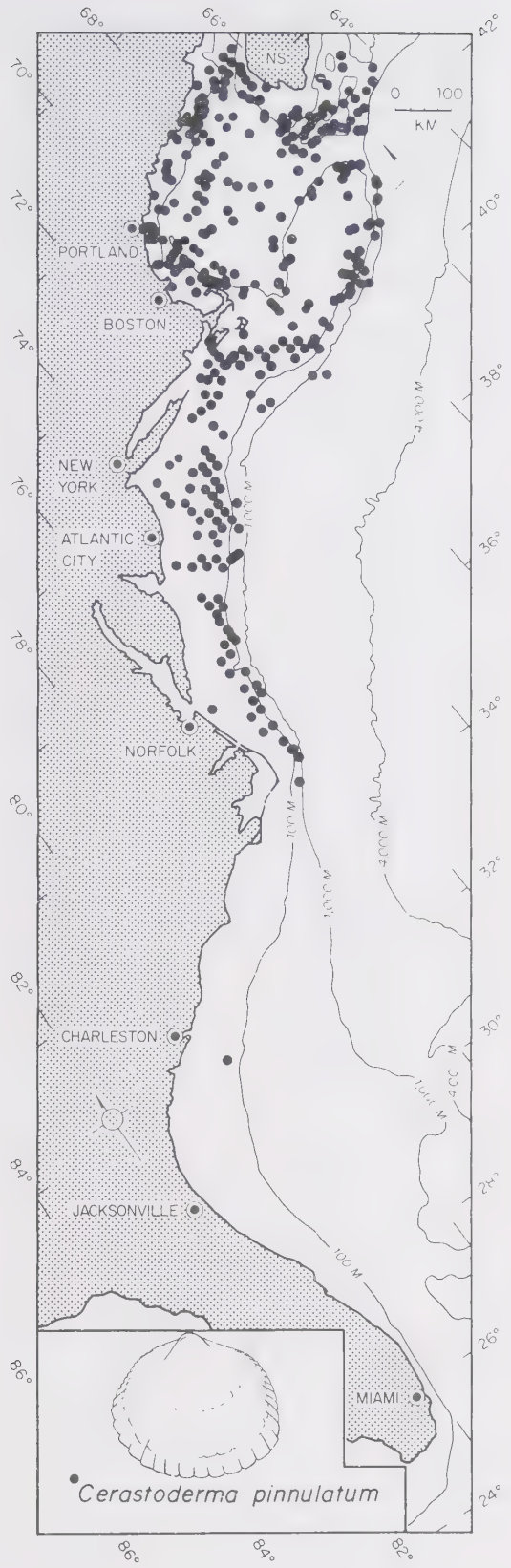

Figure 23.—Geographic distribution of *Cerastoderma pinnulatum*.

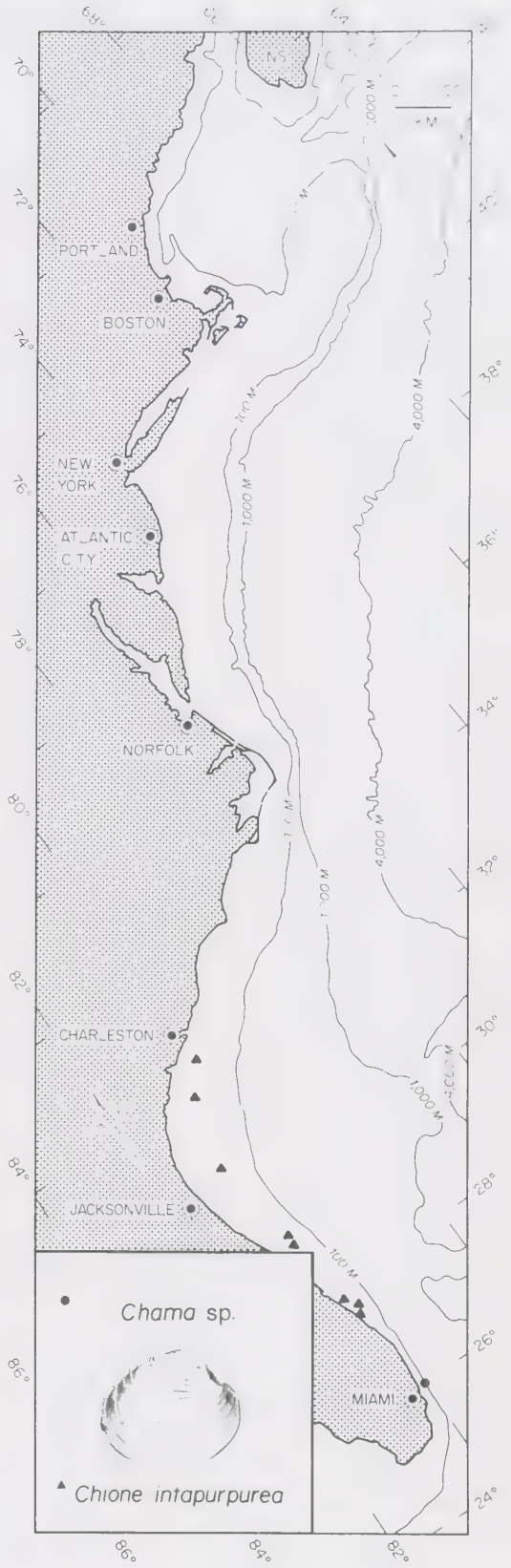

Figure 24.—Geographic distribution of *Chama* sp. and *Chione intapurpurea*.

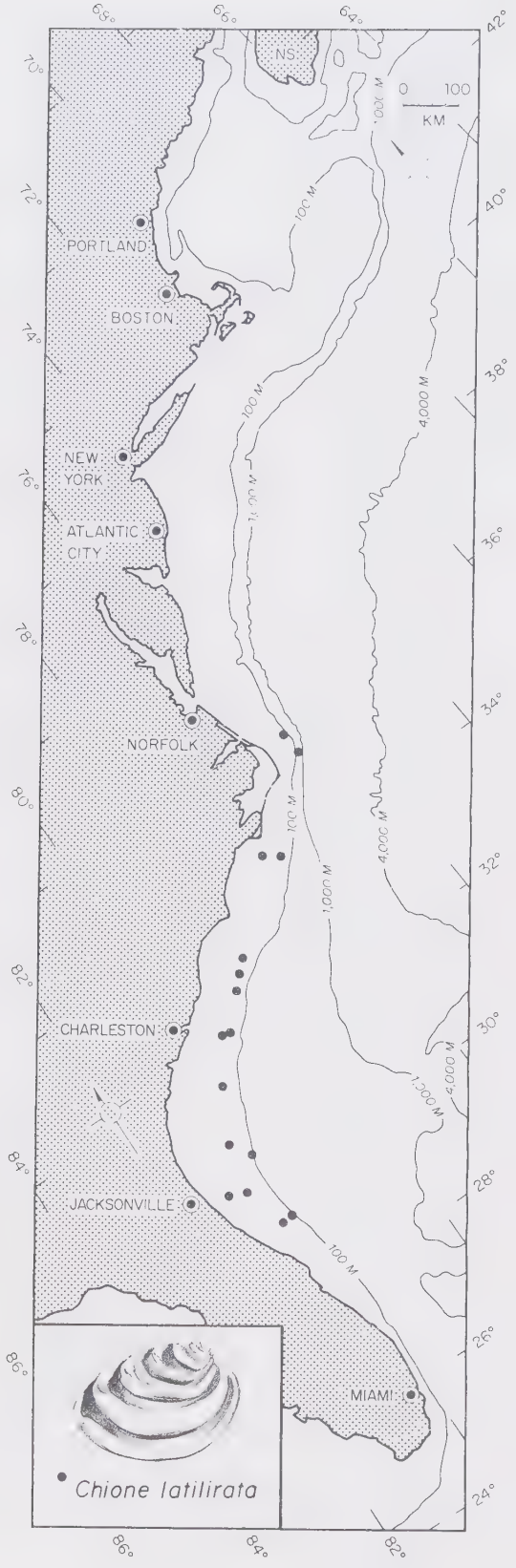

Figure 25.—Geographic distribution of *Chione latilirata*.

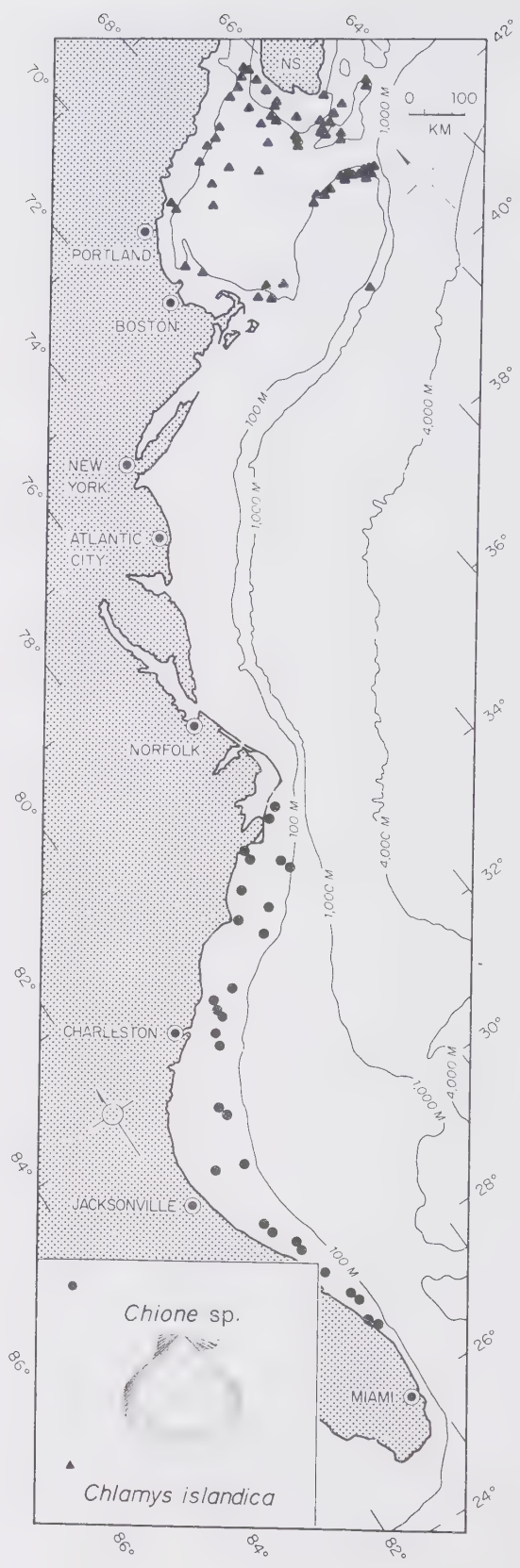

Figure 26.—Geographic distribution of *Chione* sp. and *Chlamys islandica*.

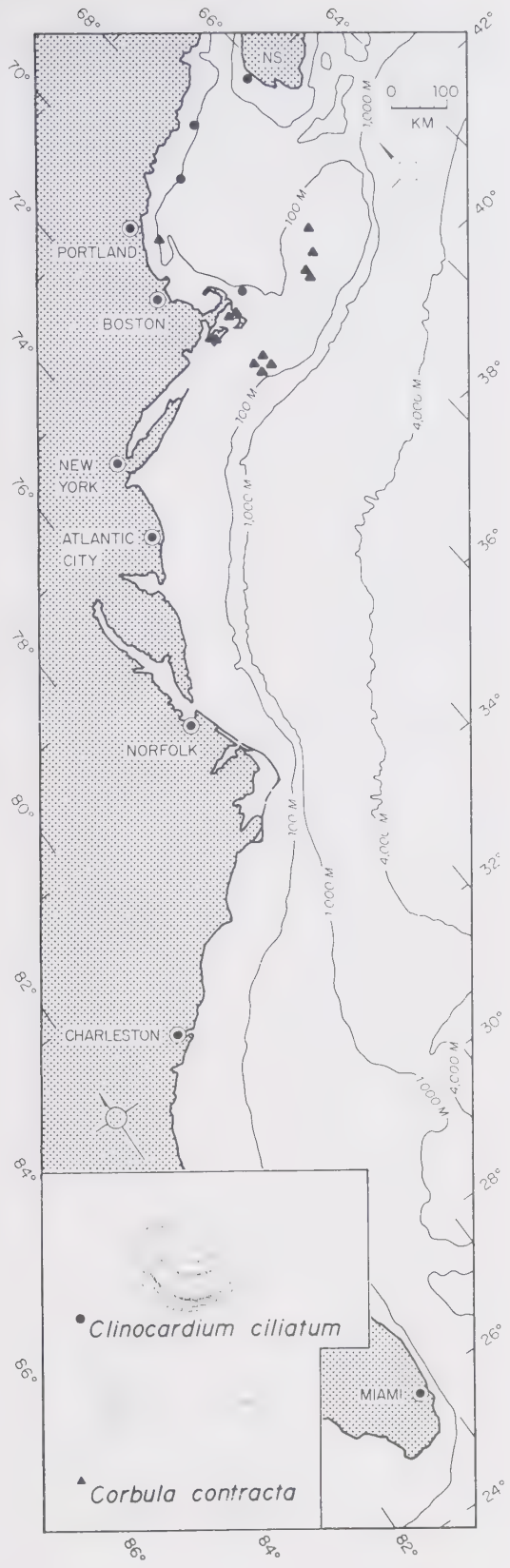

Figure 27.—Geographic distribution of *Clinocardium ciliatum* and *Corbula contracta*.

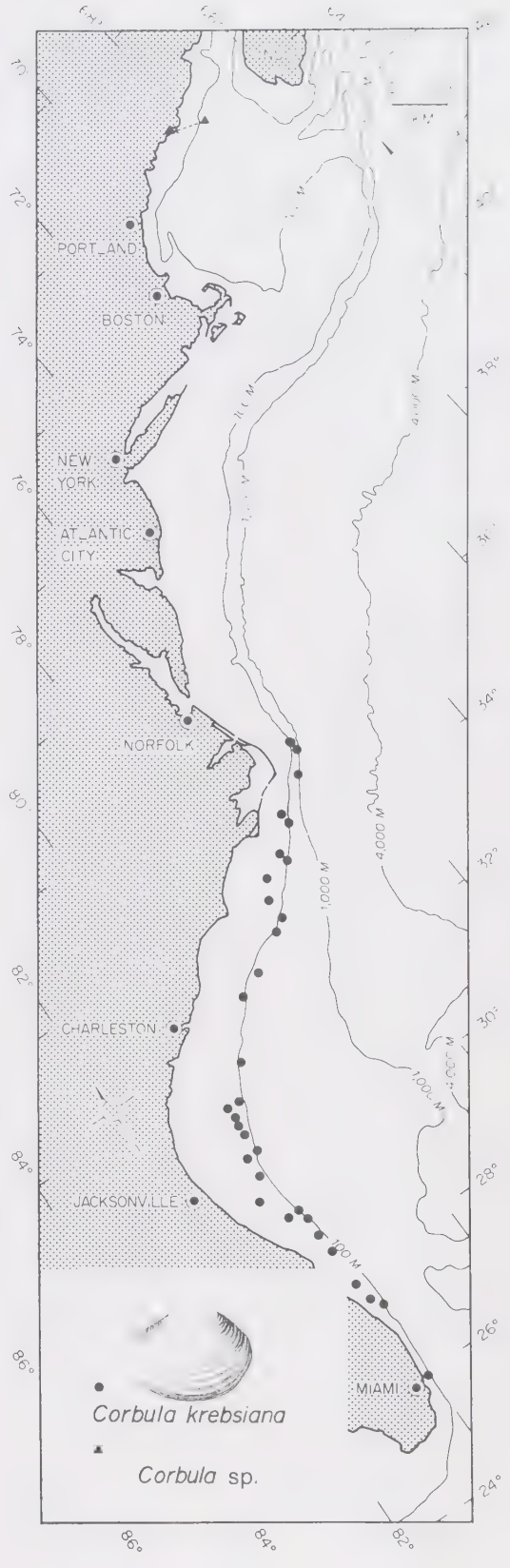

Figure 28.—Geographic distribution of *Corbula krebsiana* and *Corbula* sp.

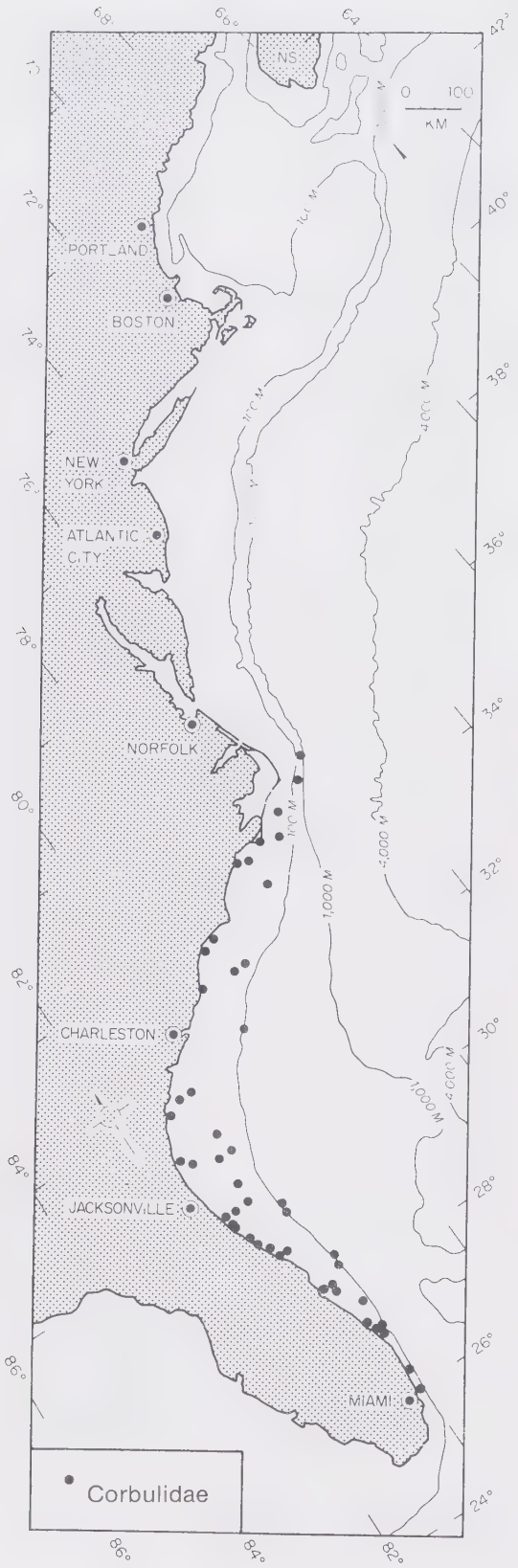

Figure 29.—Geographic distribution of Corbulidae.

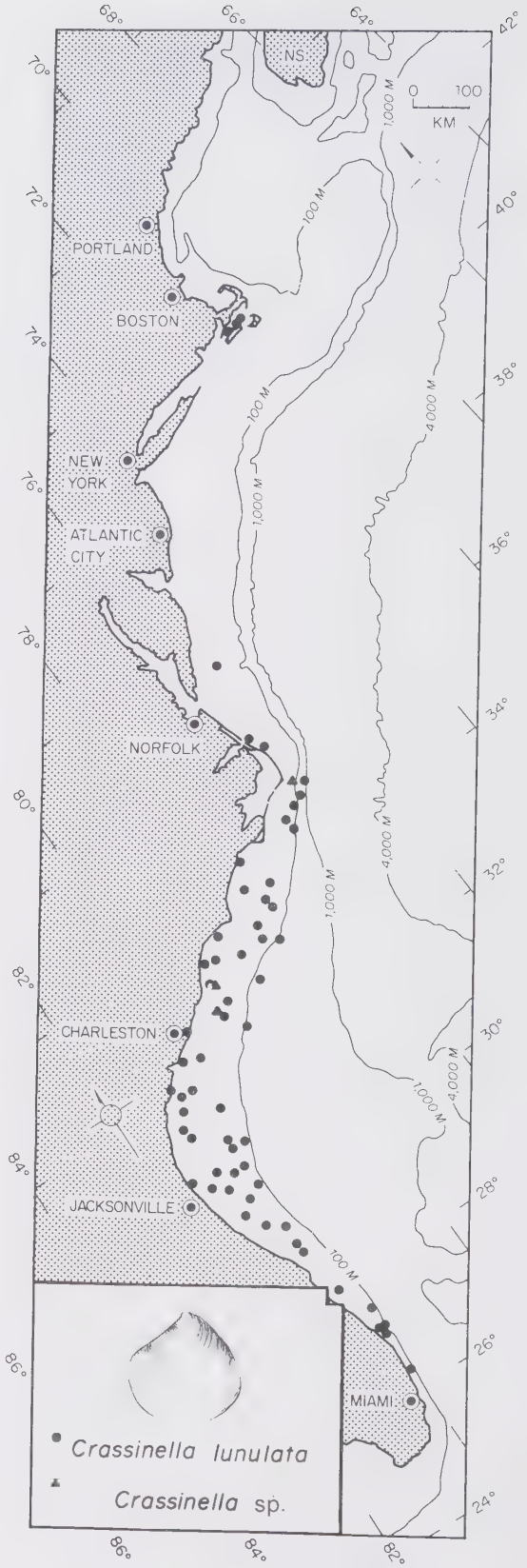

Figure 30.—Geographic distribution of *Crassinella lunlata* and *Crassinella* sp.

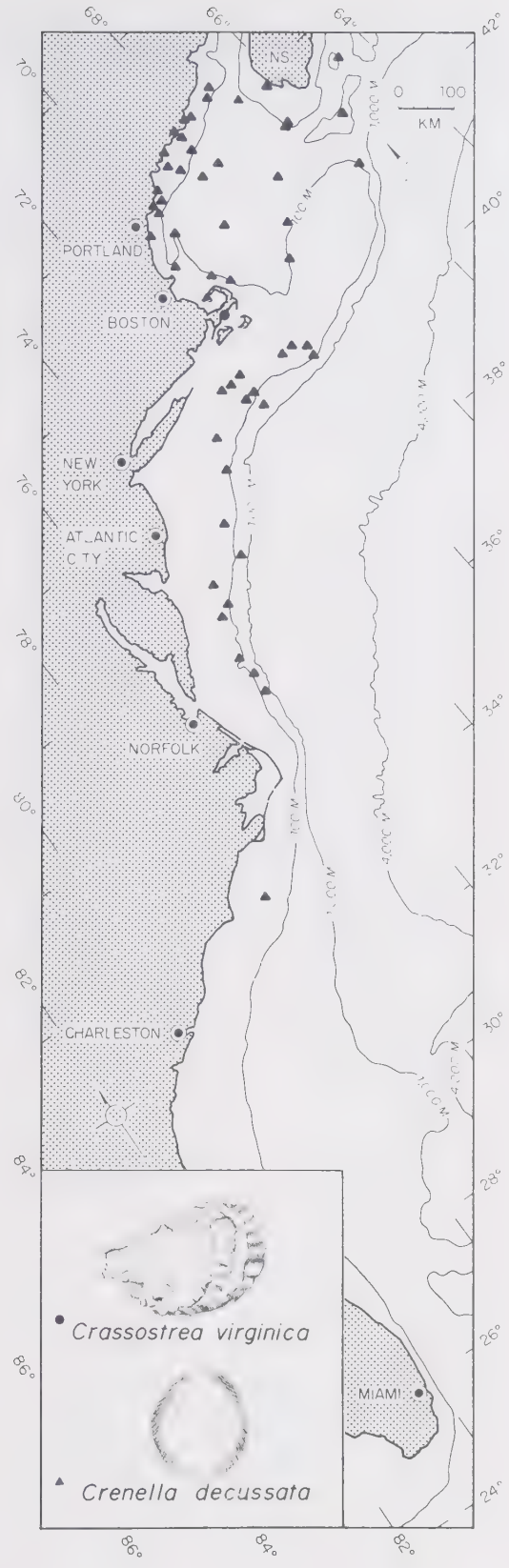

Figure 31.—Geographic distribution of *Crassostrea virginica* and *Crenella decussata*.

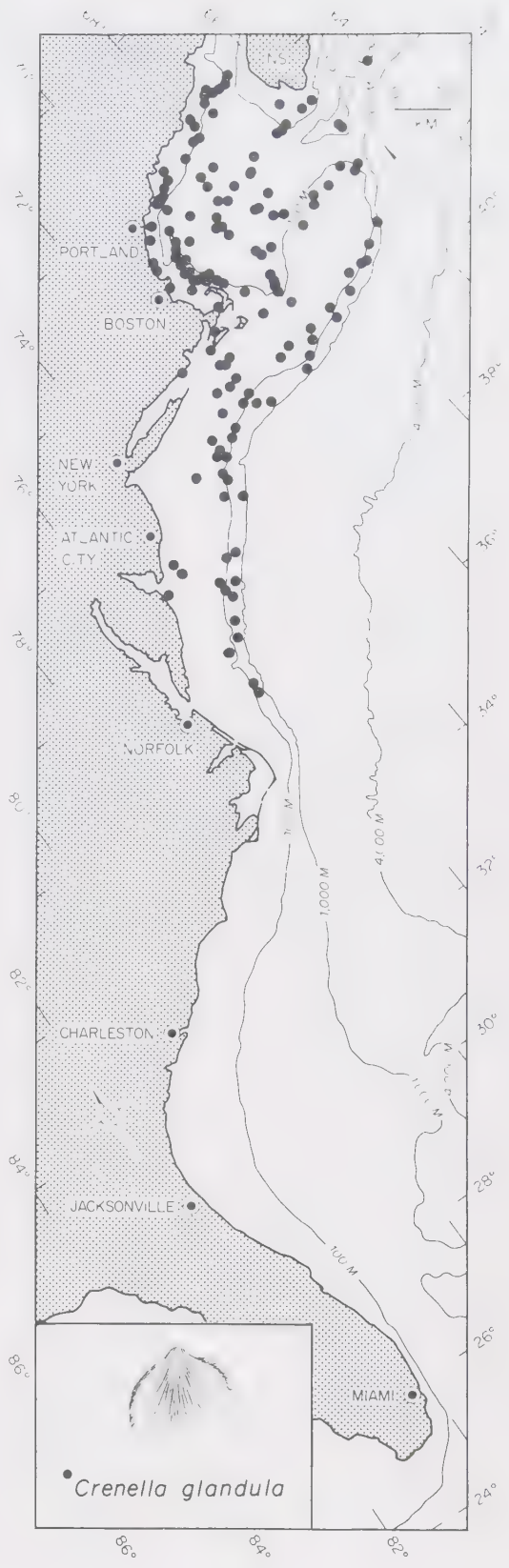

Figure 32.—Geographic distribution of *Crenella glandula*.

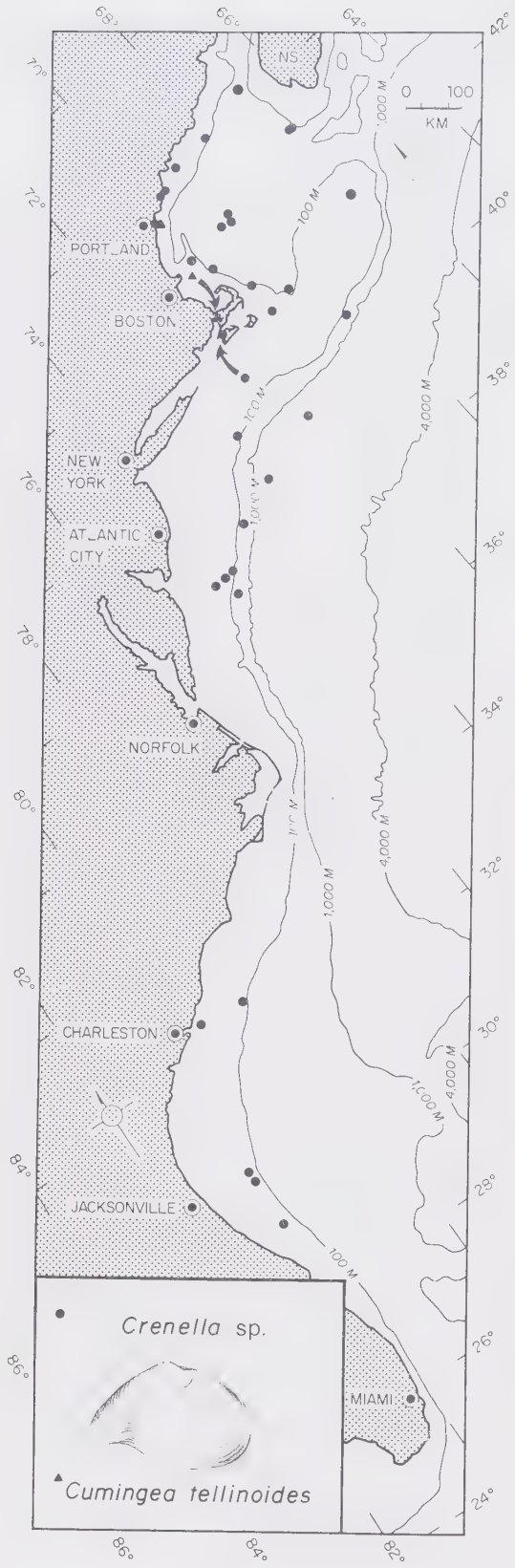

Figure 33.—Geographic distribution of *Crenella* sp. and *Cumingea tellinoides*.

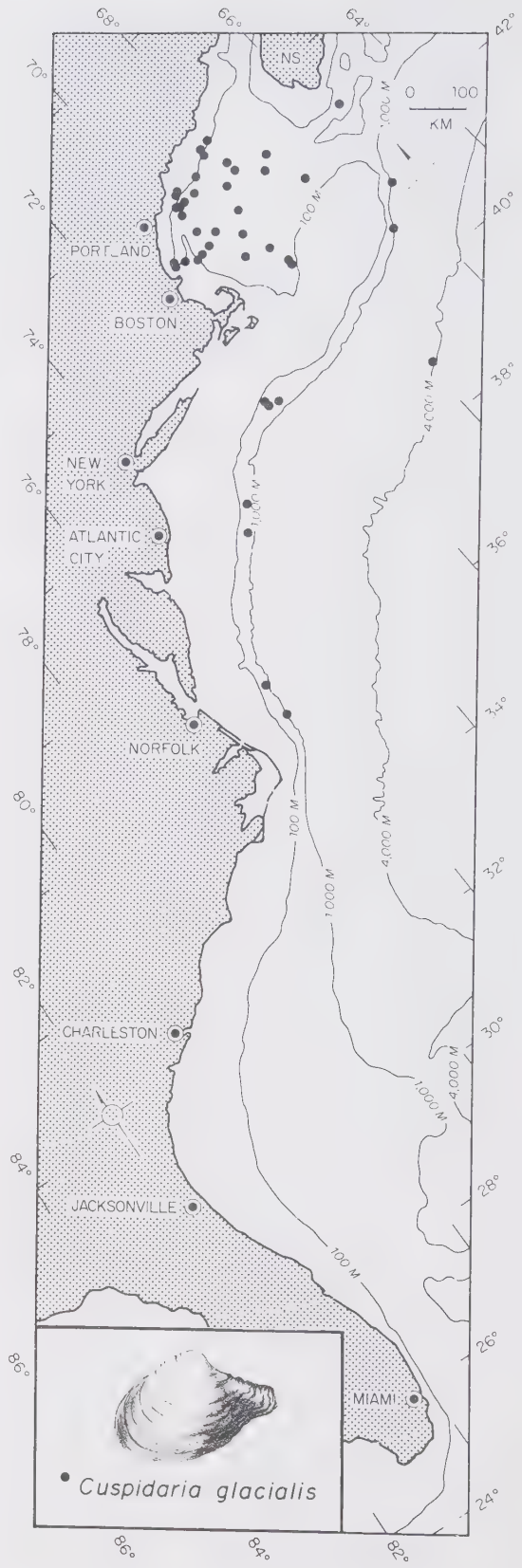

Figure 34.—Geographic distribution of *Cuspidaria glacialis*.

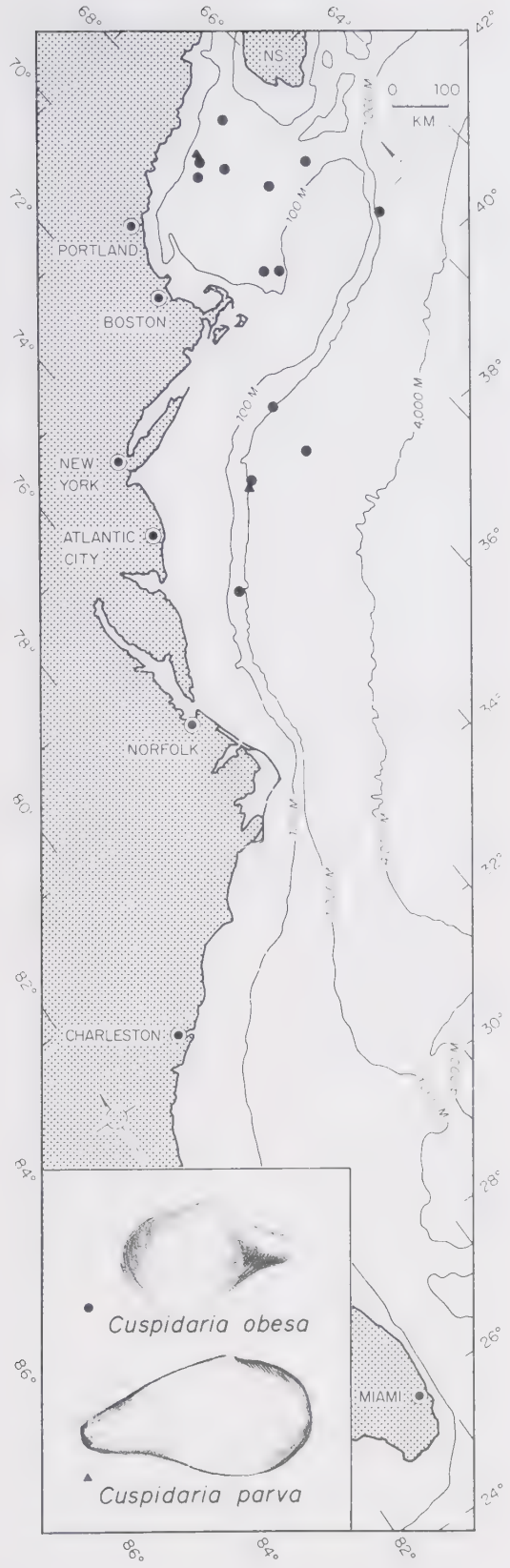

Figure 35.—Geographic distribution of *Cuspidaria obesa* and *Cuspidaria parva*.

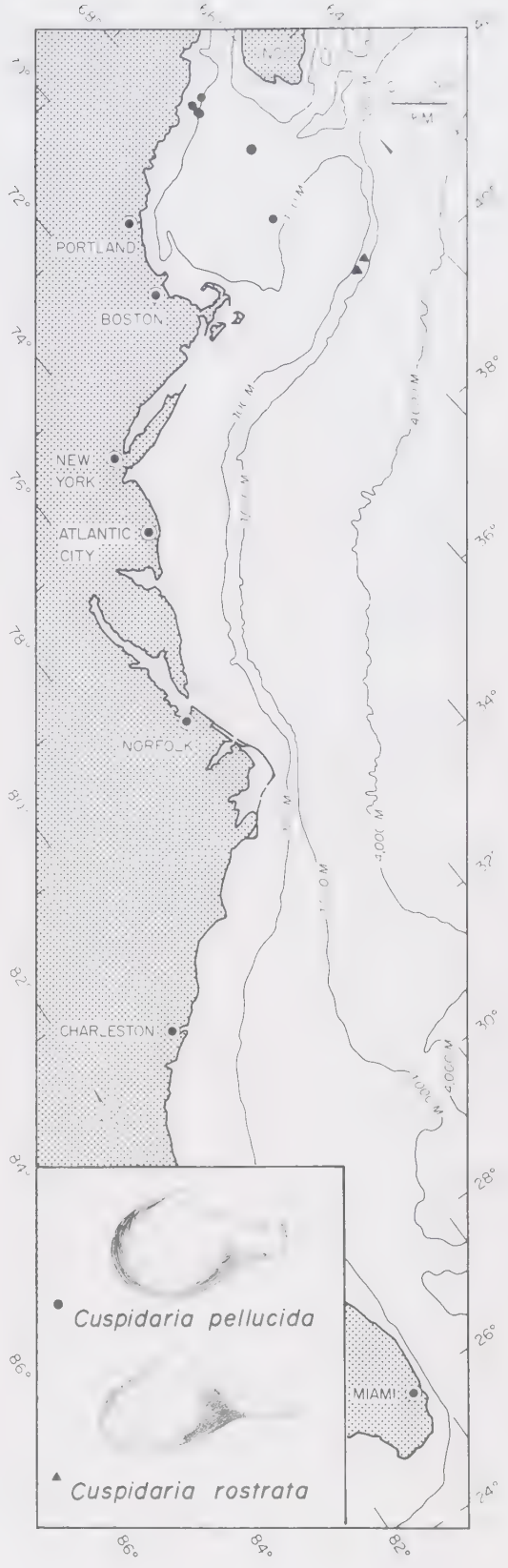

Figure 36.—Geographic distribution of *Cuspidaria pellucida* and *Cuspidaria rostrata*.

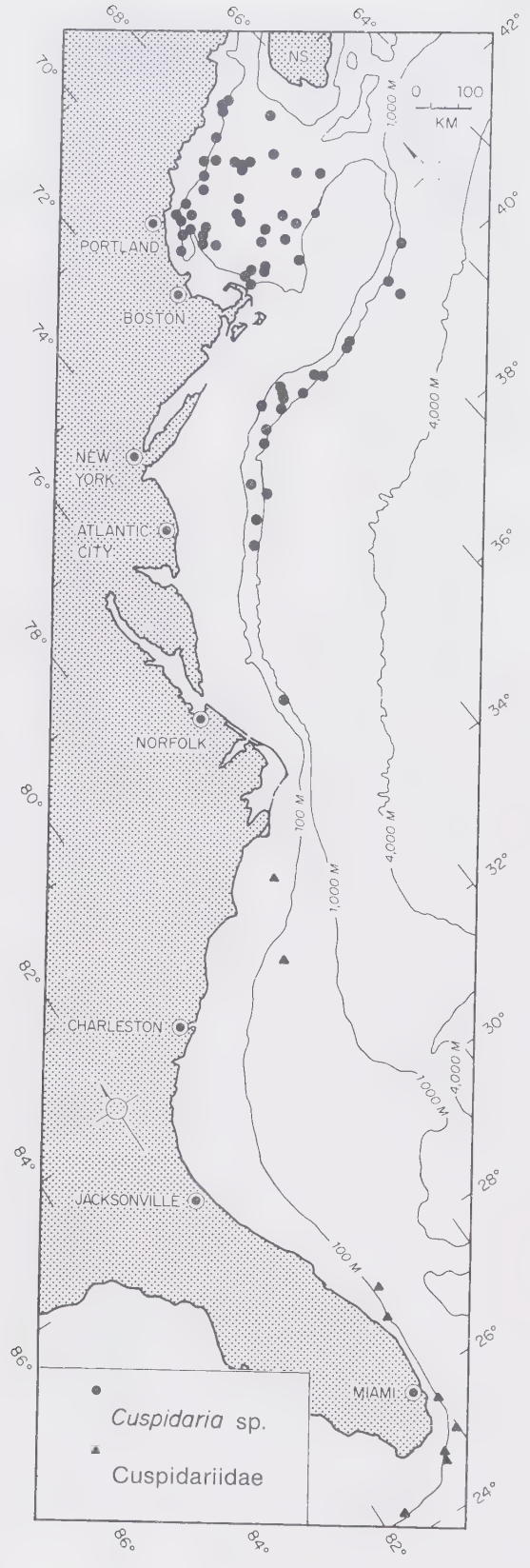

Figure 37.—Geographic distribution of *Cuspidaria* sp. and Cuspidariidae.

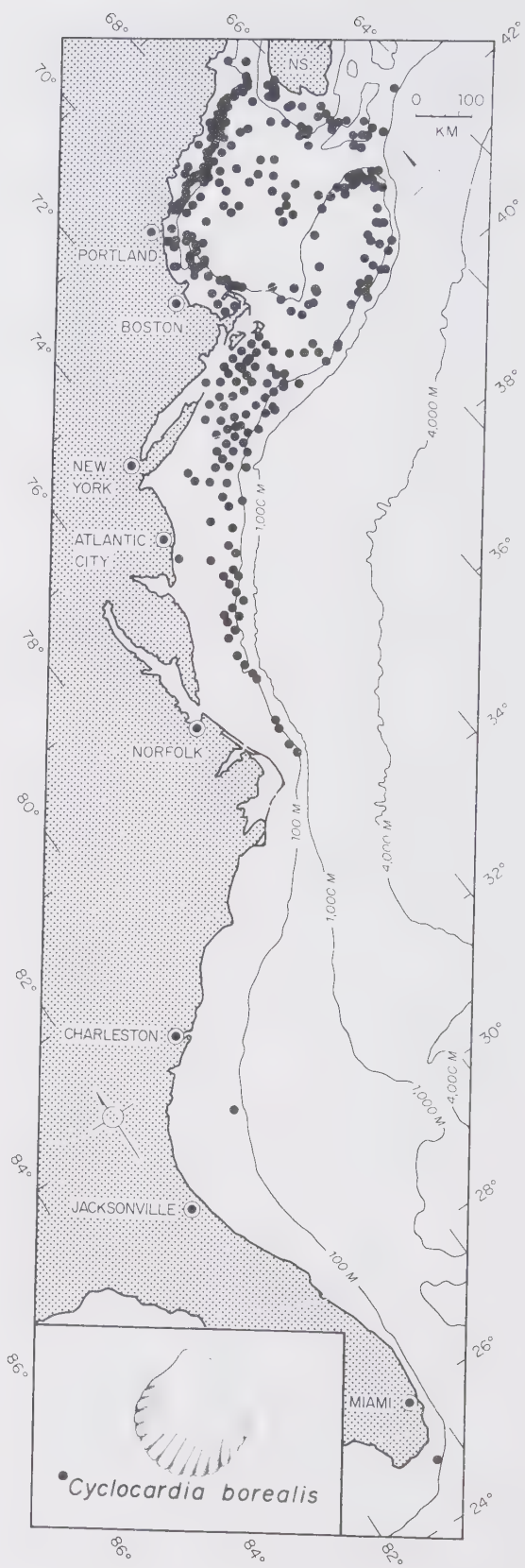

Figure 38.—Geographic distribution of *Cyclocardia borealis*.

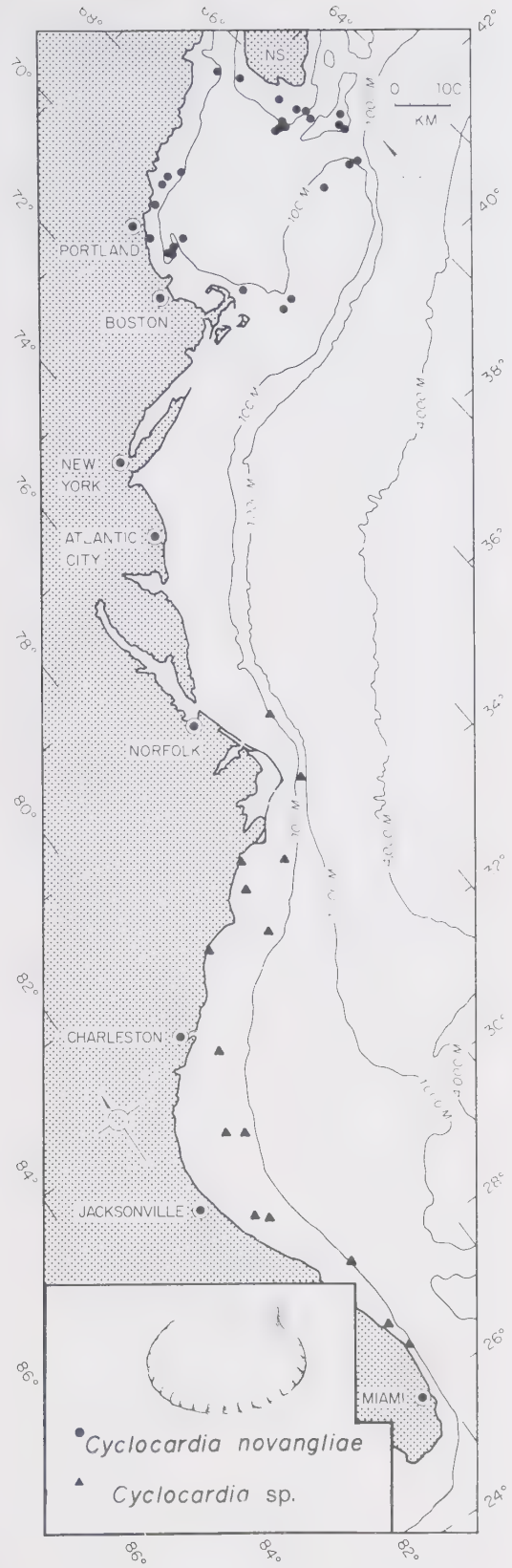

Figure 39.—Geographic distribution of *Cyclocardia novangliae* and *Cyclocardia* sp.

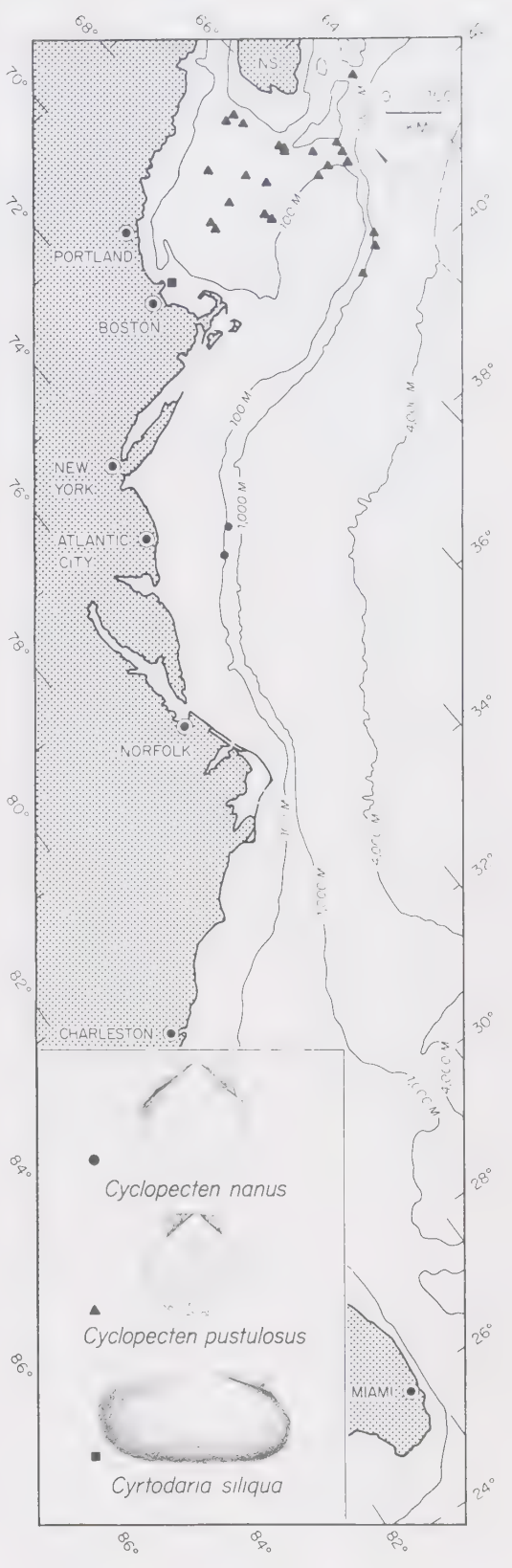

Figure 40.—Geographic distribution of *Cyclopecten nanus*, *Cyclopecten pustulosus*, and *Cyrtodaria siliqua*.

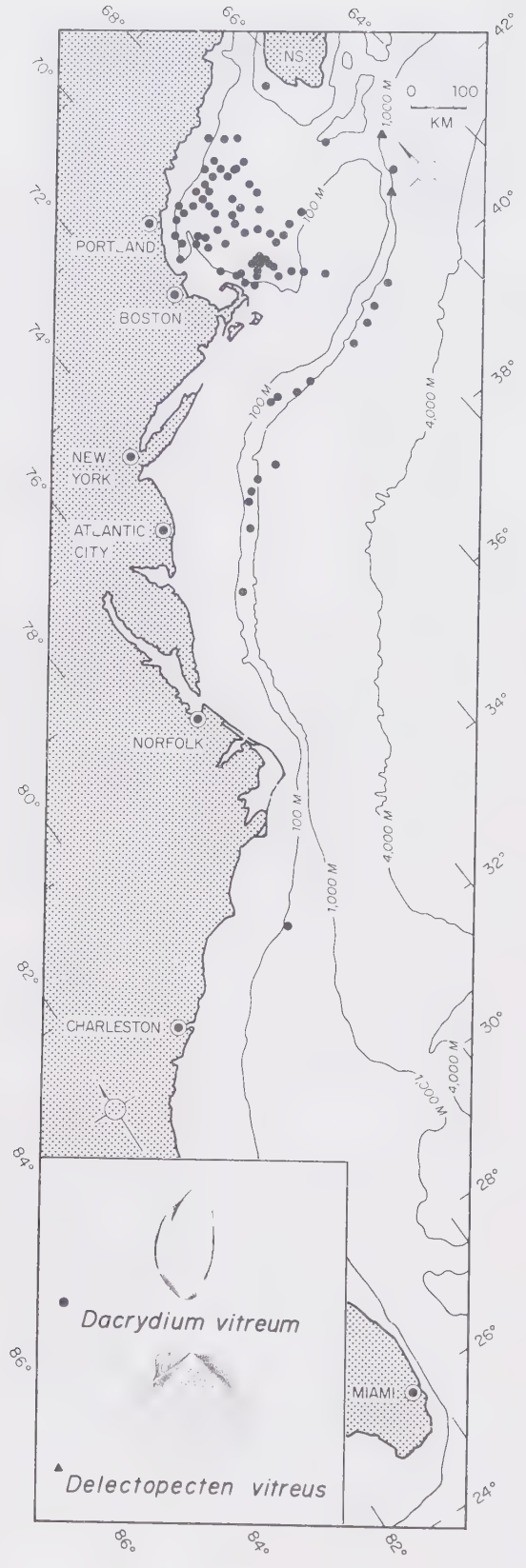

Figure 41.—Geographic distribution of *Dacrydium vitreum* and *Delectopecten vitreus*.

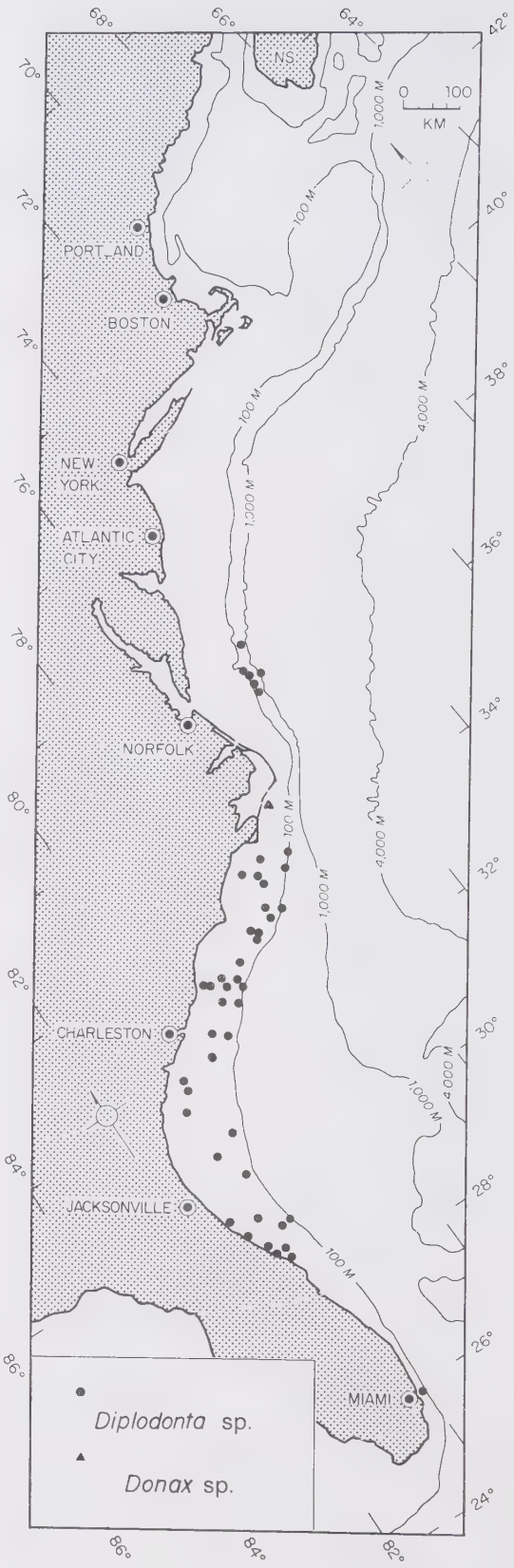

Figure 42.—Geographic distribution of *Diplodonta* sp. and *Donax* sp

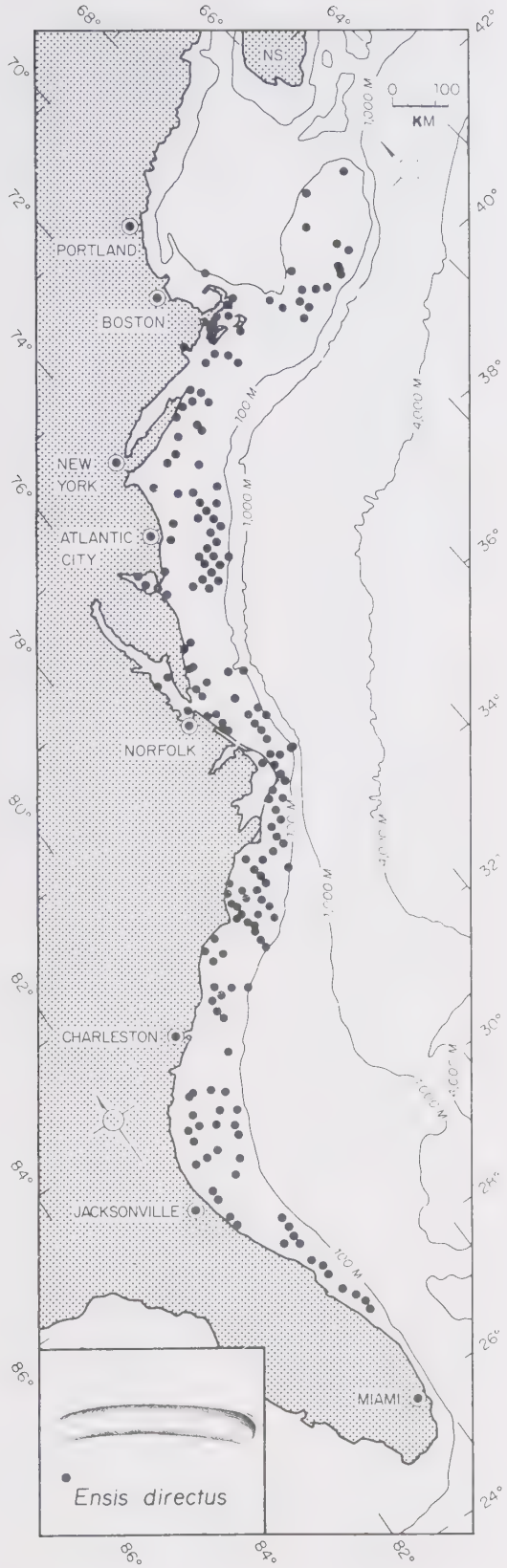

Figure 43.—Geographic distribution of *Ensis directus*.

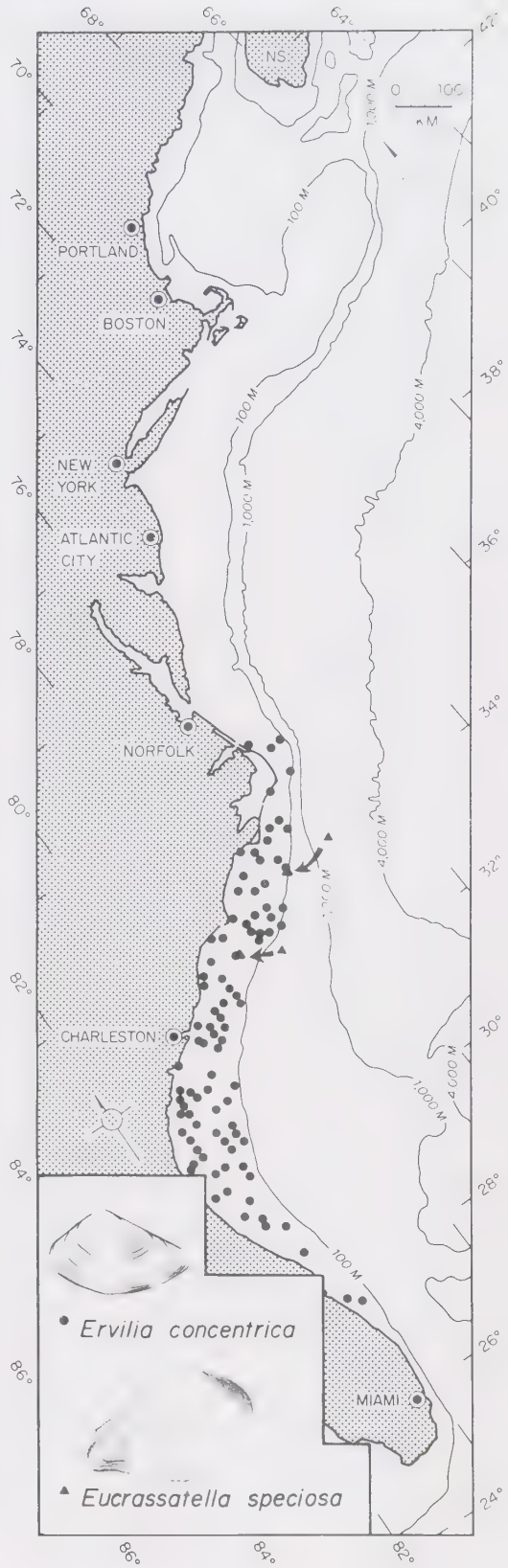

Figure 44.—Geographic distribution of *Ervilia concentrica* and *Eucrassatella speciosa*.

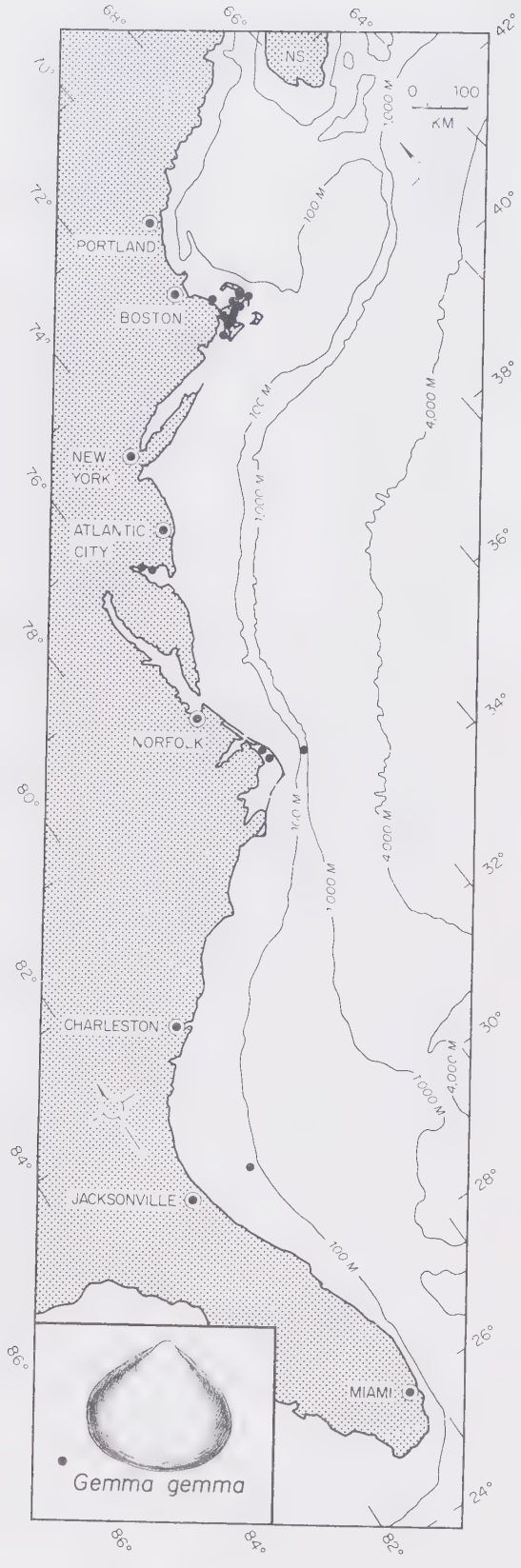

Figure 45.—Geographic distribution of *Gemma gemma*.

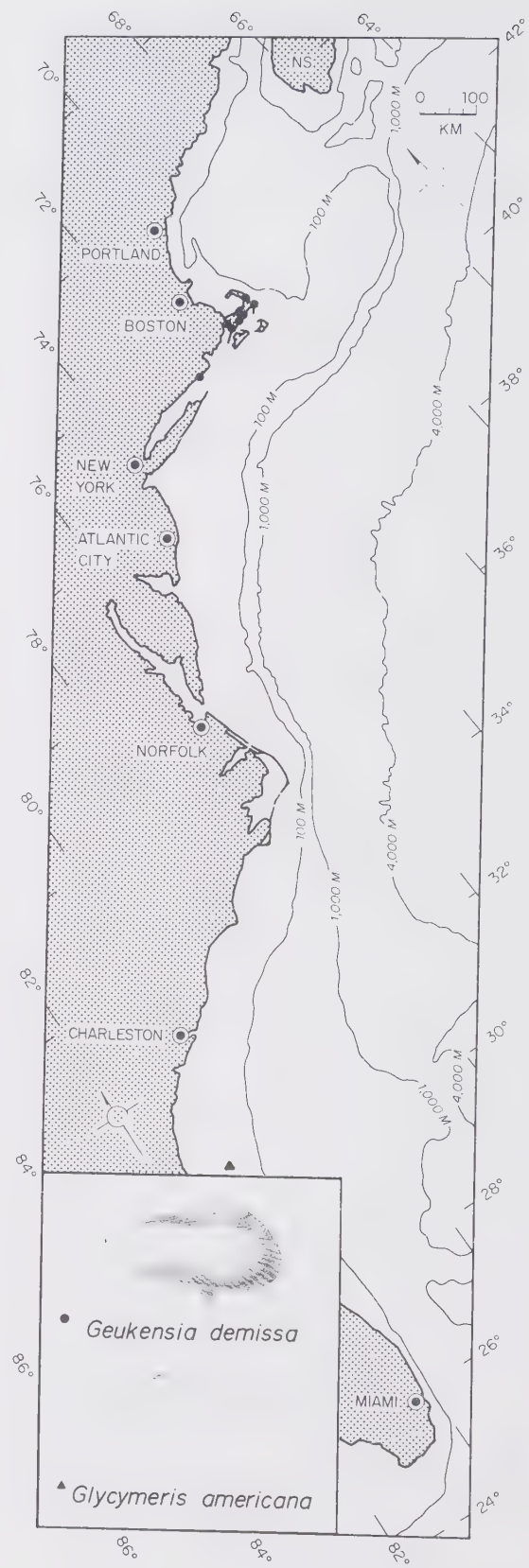

Figure 46.—Geographic distribution of *Geukensia demissa* and *Glycymeris americana*.

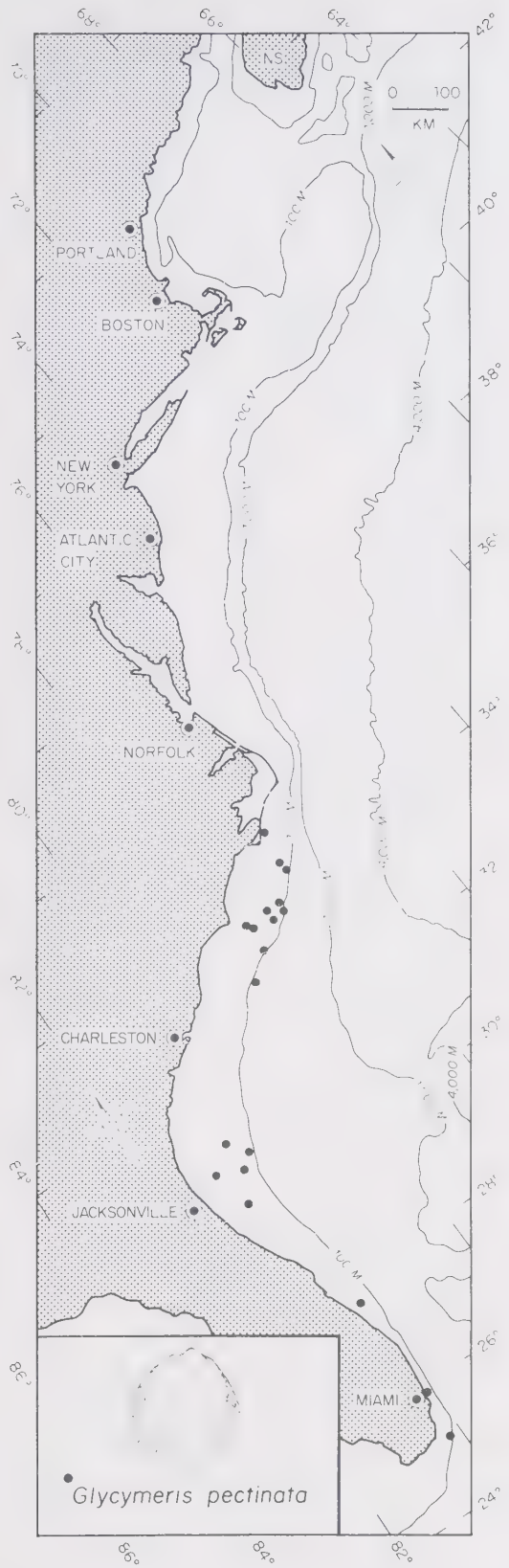

Figure 47.—Geographic distribution of *Glycymeris pectinata*.

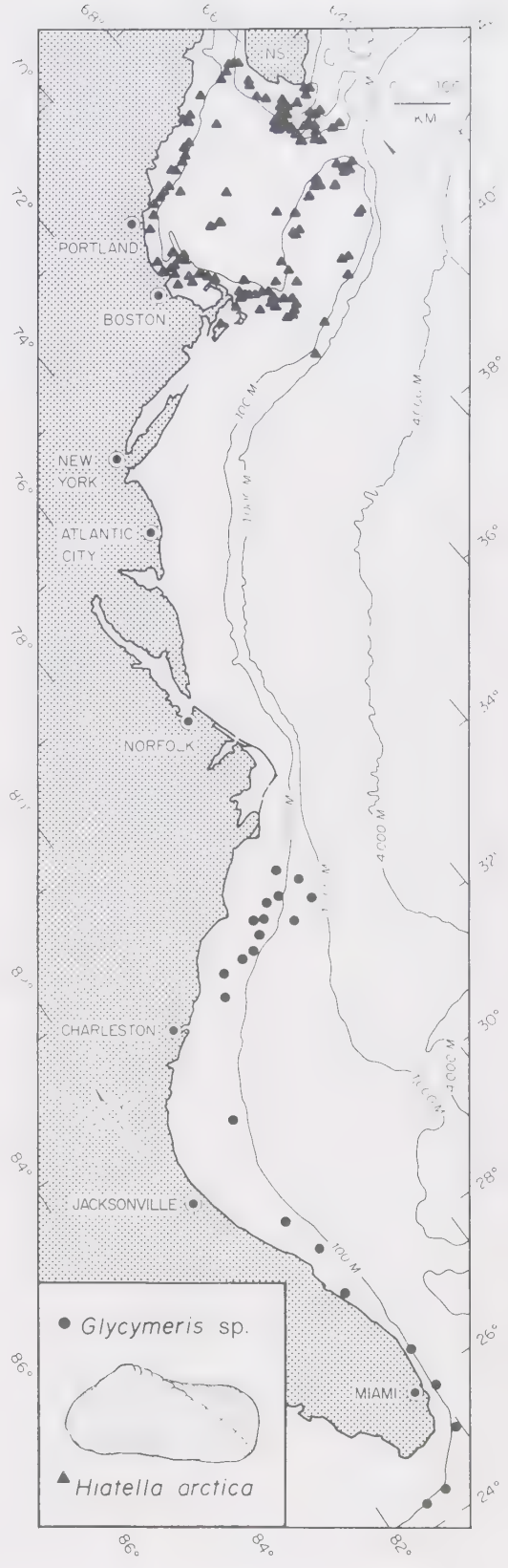

Figure 48.—Geographic distribution of *Glycymeris* sp. and *Hiatella arctica*.

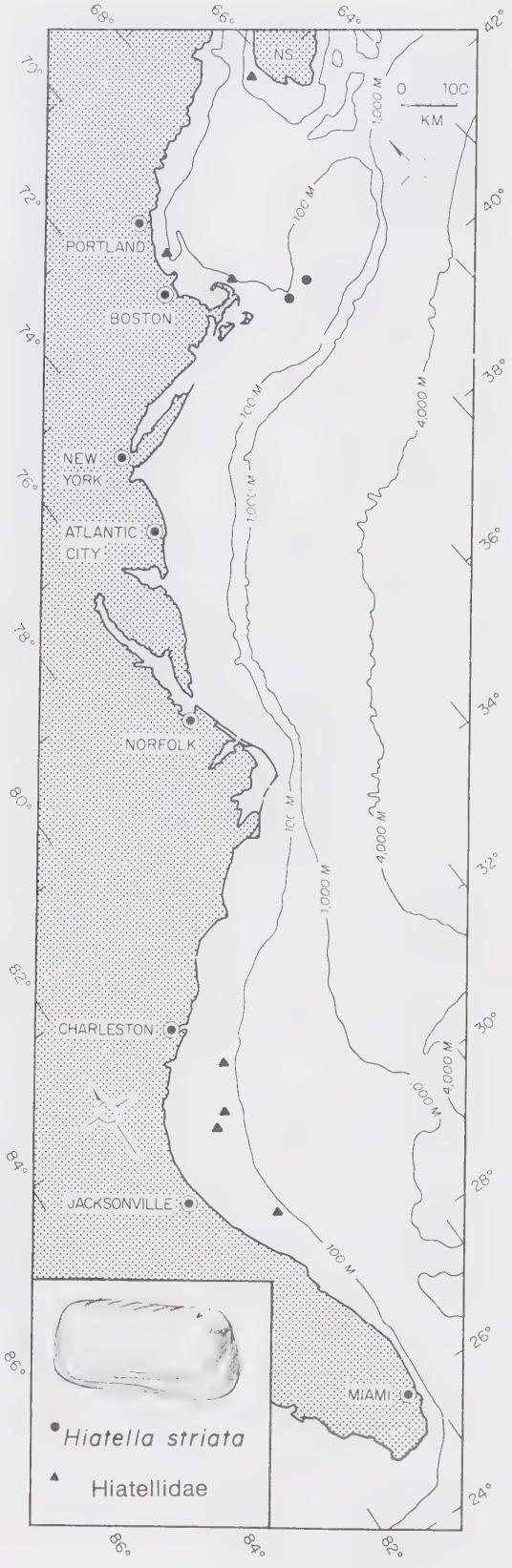

Figure 49.—Geographic distribution of *Hiatella striata* and Hiatellidae.

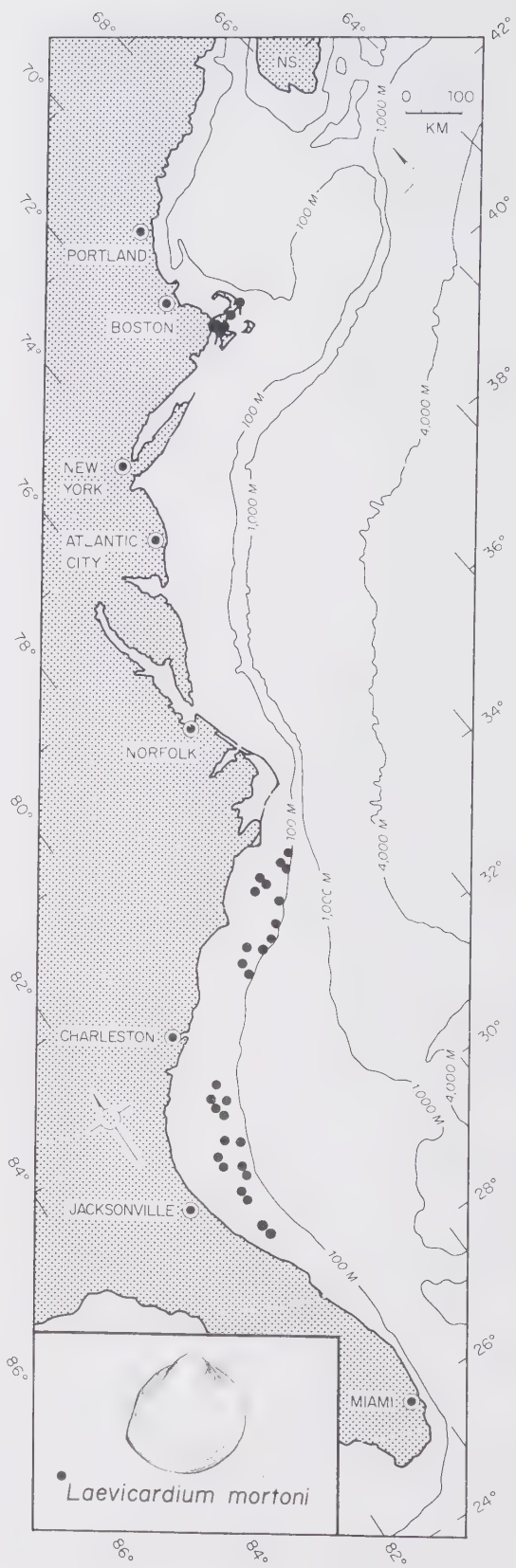

Figure 50.—Geographic distribution of *Laevicardium mortoni*.

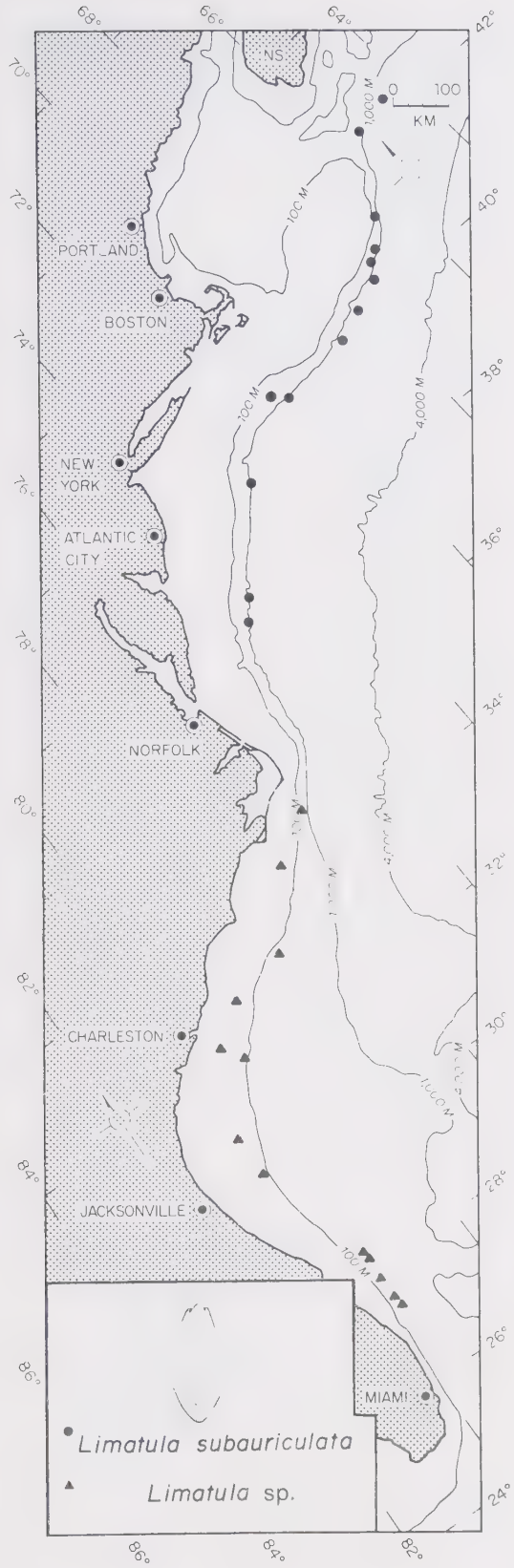

Figure 51.—Geographic distribution of *Limatula subauriculata* and *Limatula* sp.

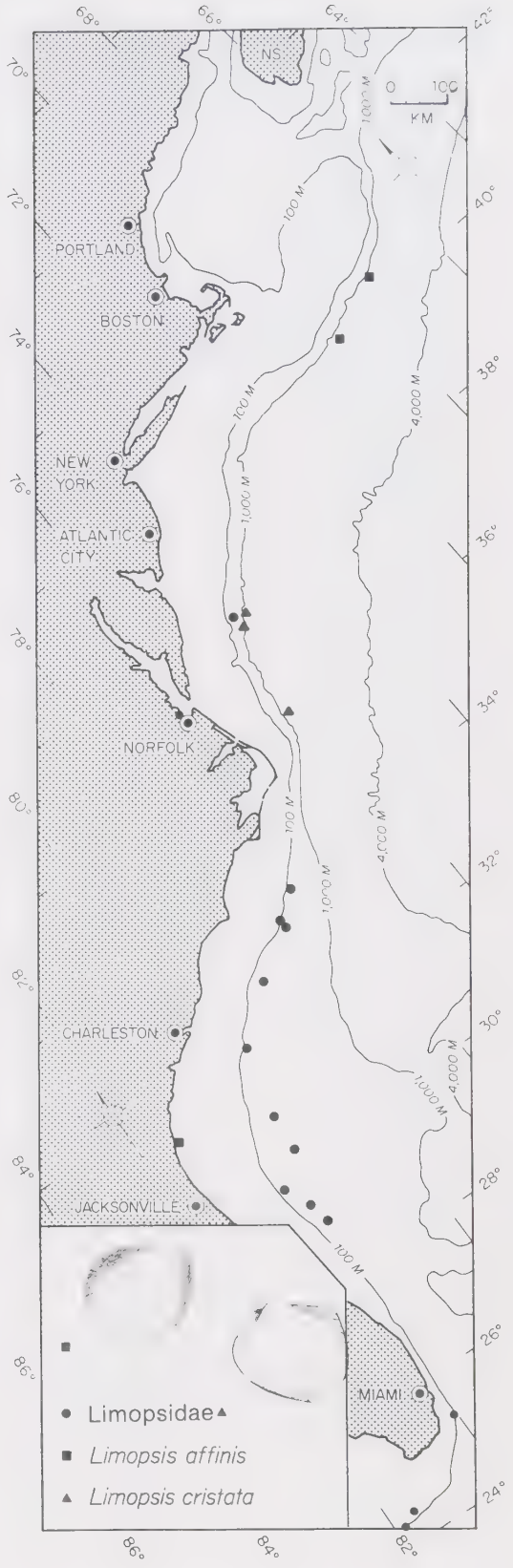

Figure 52.—Geographic distribution of Limopsidae, *Limopsis affinis*, and *Limopsis cristata*.

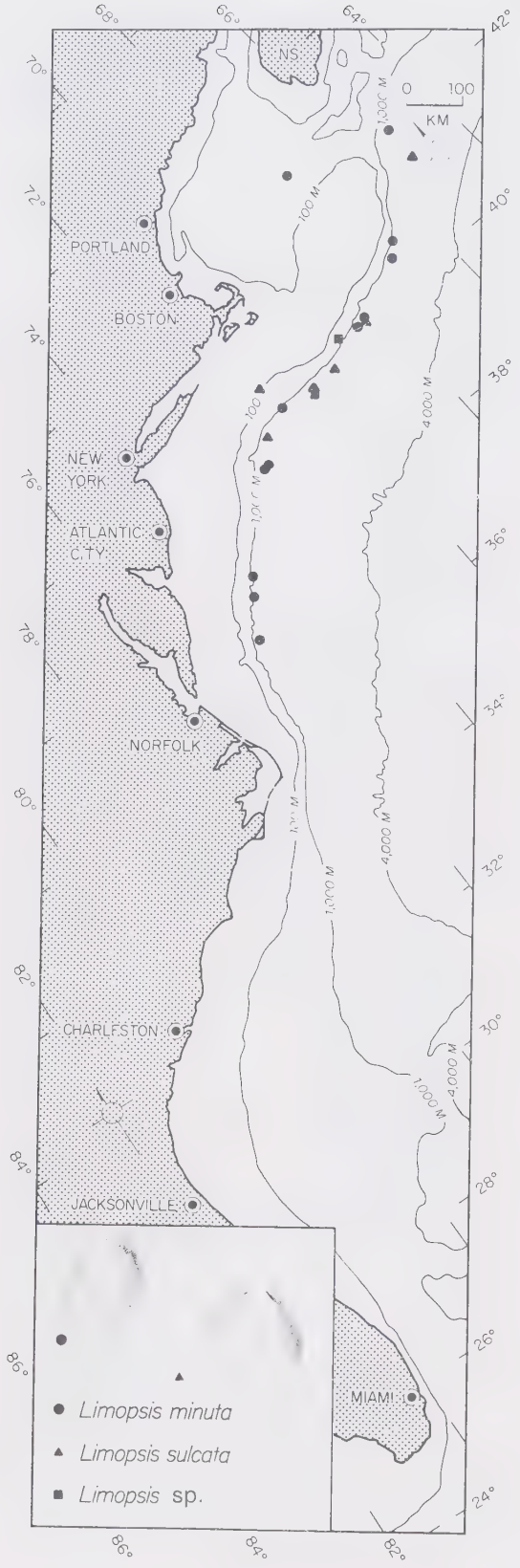

Figure 53.—Geographic distribution of *Limopsis minuta*, *Limopsis sulcata*, and *Limopsis* sp.

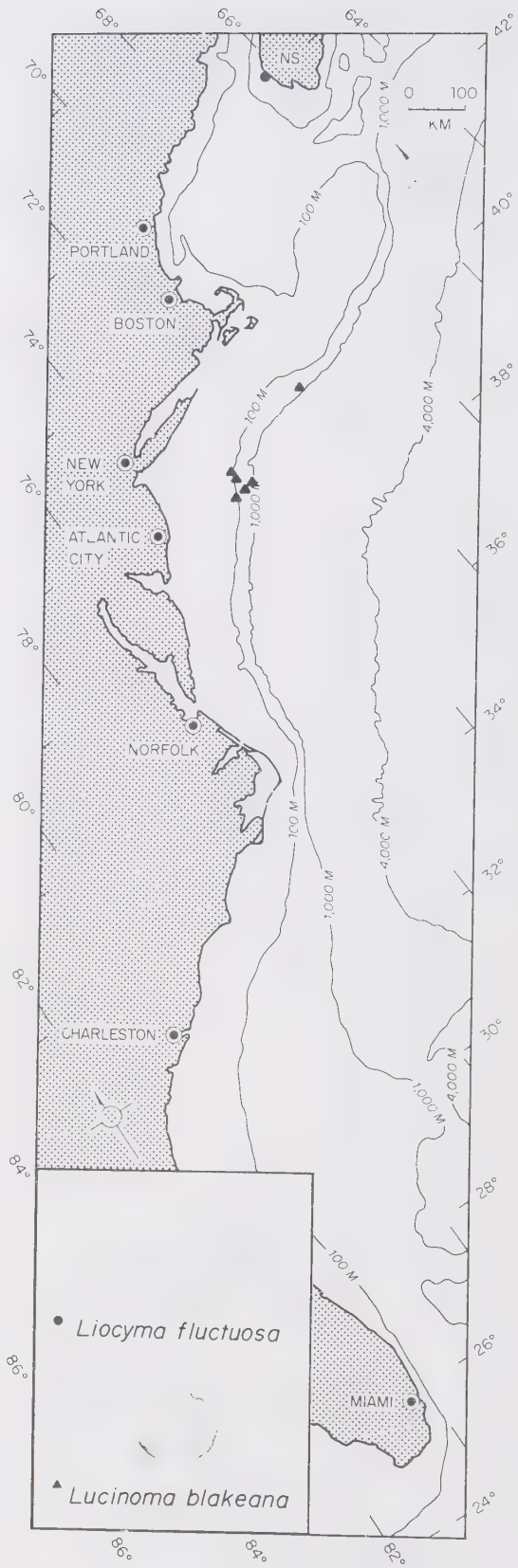

Figure 54.—Geographic distribution of *Liocyma fluctuosa* and *Lucinoma blakeana*.

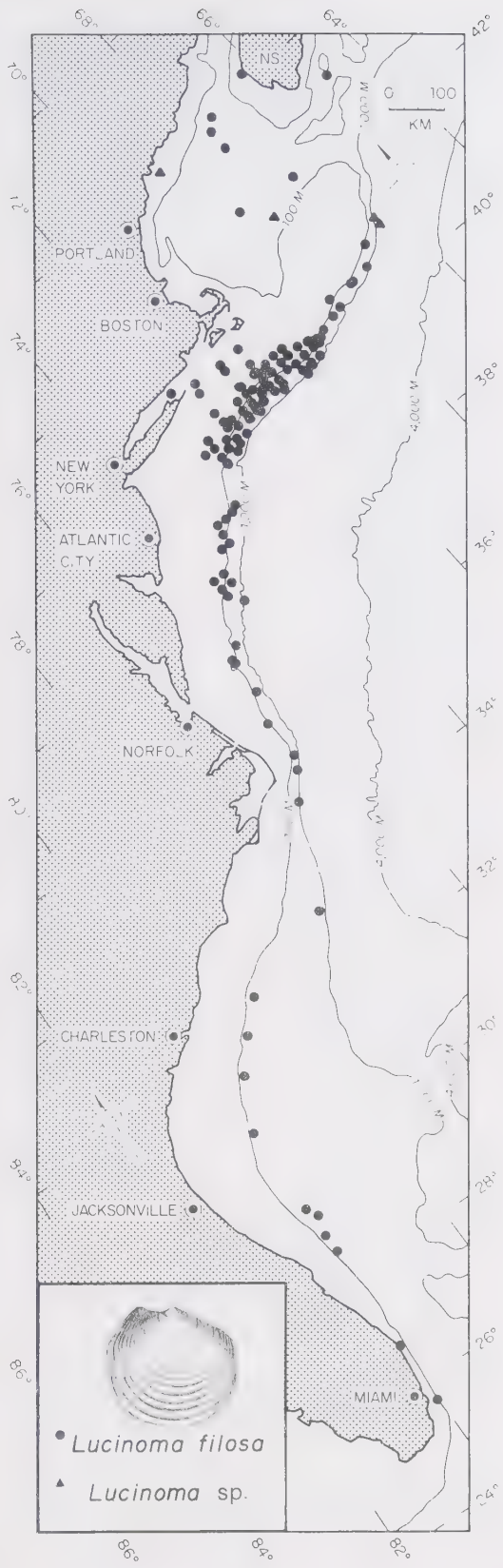

Figure 55.—Geographic distribution of *Lucinoma filosa* and *Lucinoma* sp.

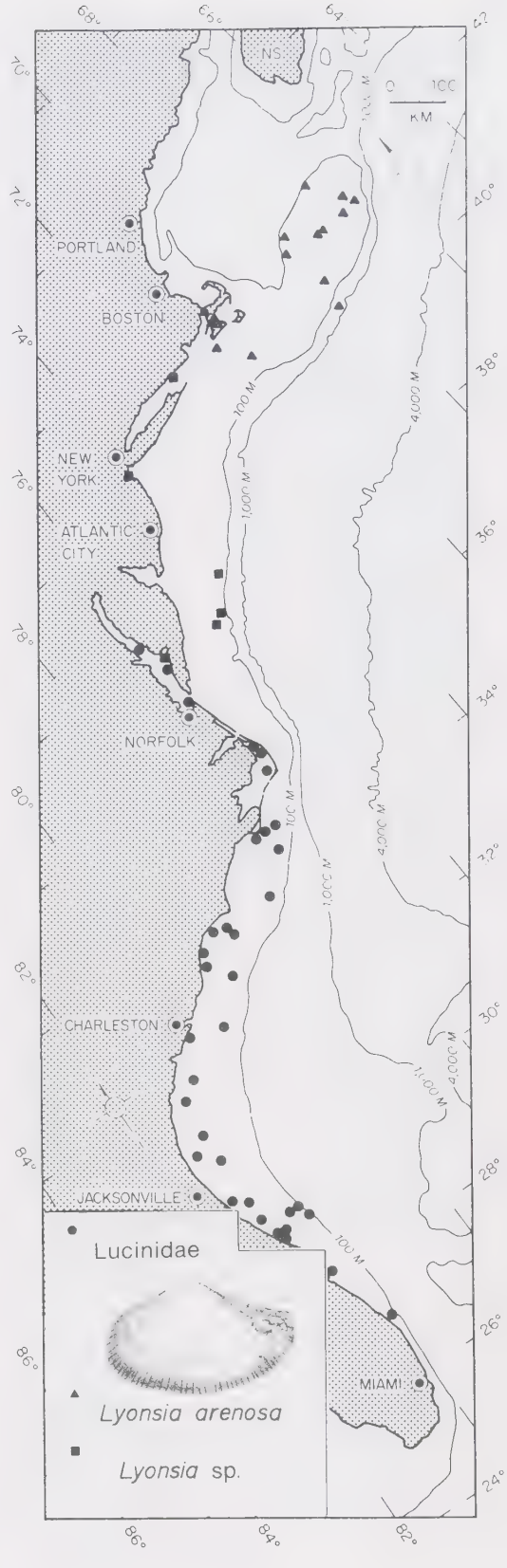

Figure 56.—Geographic distribution of Lucinidae, *Lyonsia arenosa*, and *Lyonsia* sp.

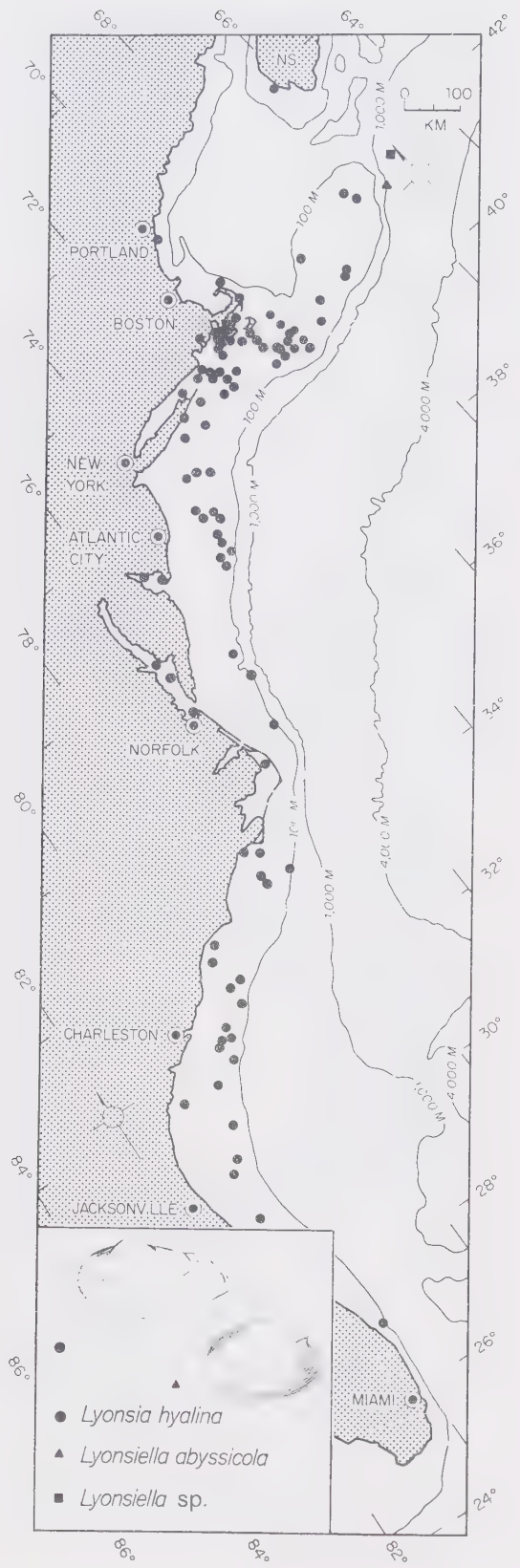

Figure 57.—Geographic distribution of *Lyonsia hyalina*, *Lyonsiella abyssicola*, and *Lyonsiella* sp.

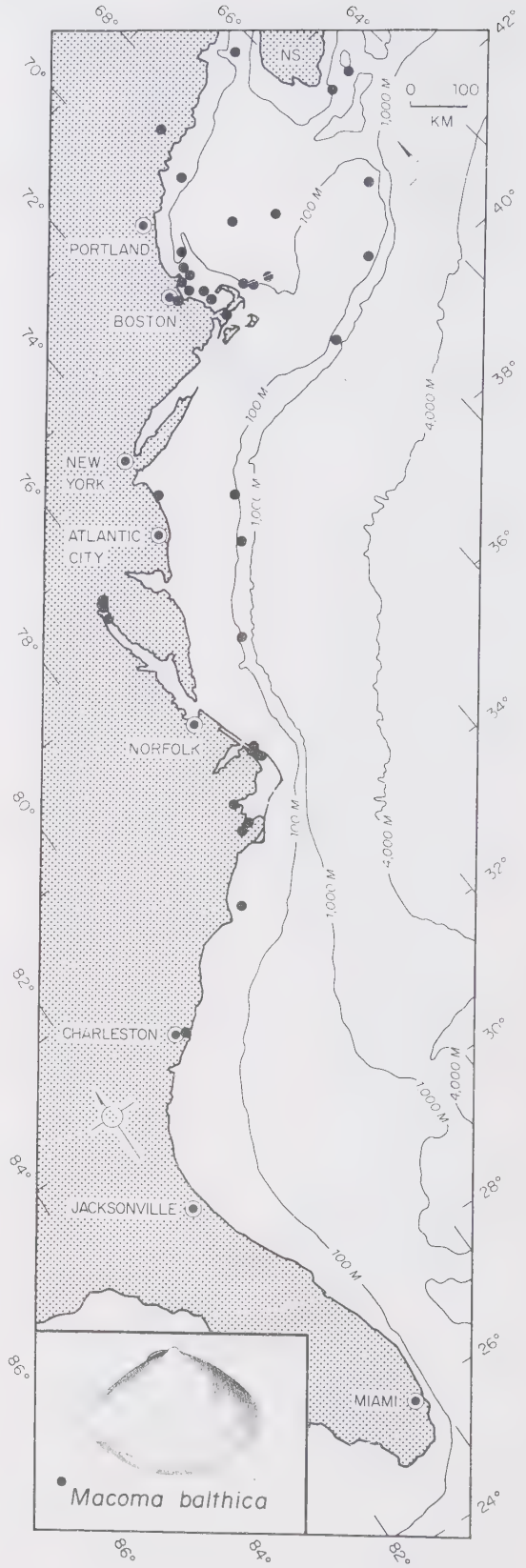

Figure 58.—Geographic distribution of *Macoma balthica*.

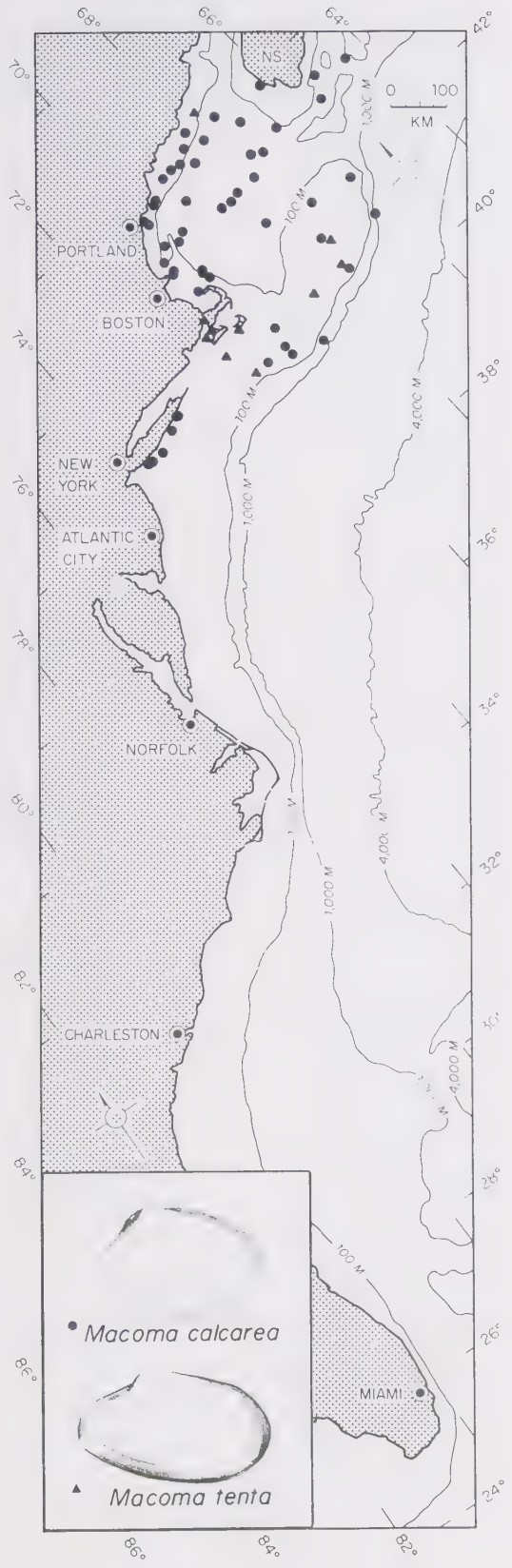

Figure 59.—Geographic distribution of *Macoma calcarea* and *Macoma tenta*.

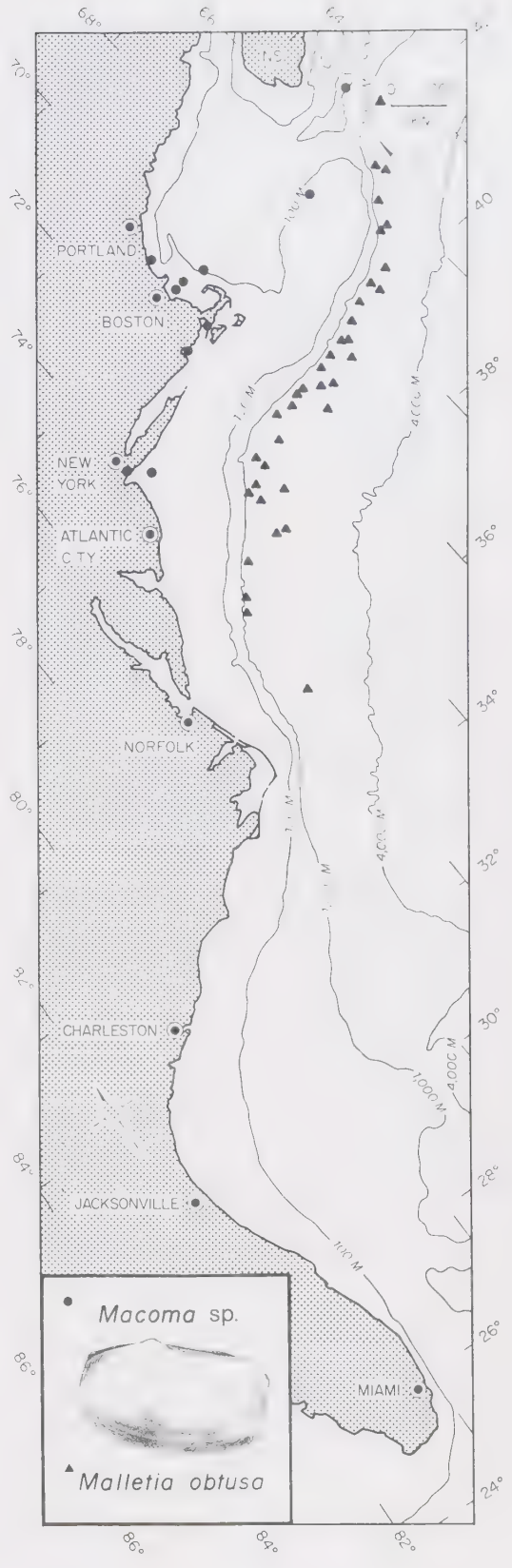

Figure 60.—Geographic distribution of *Macoma* sp. and *Malletia obtusa*.

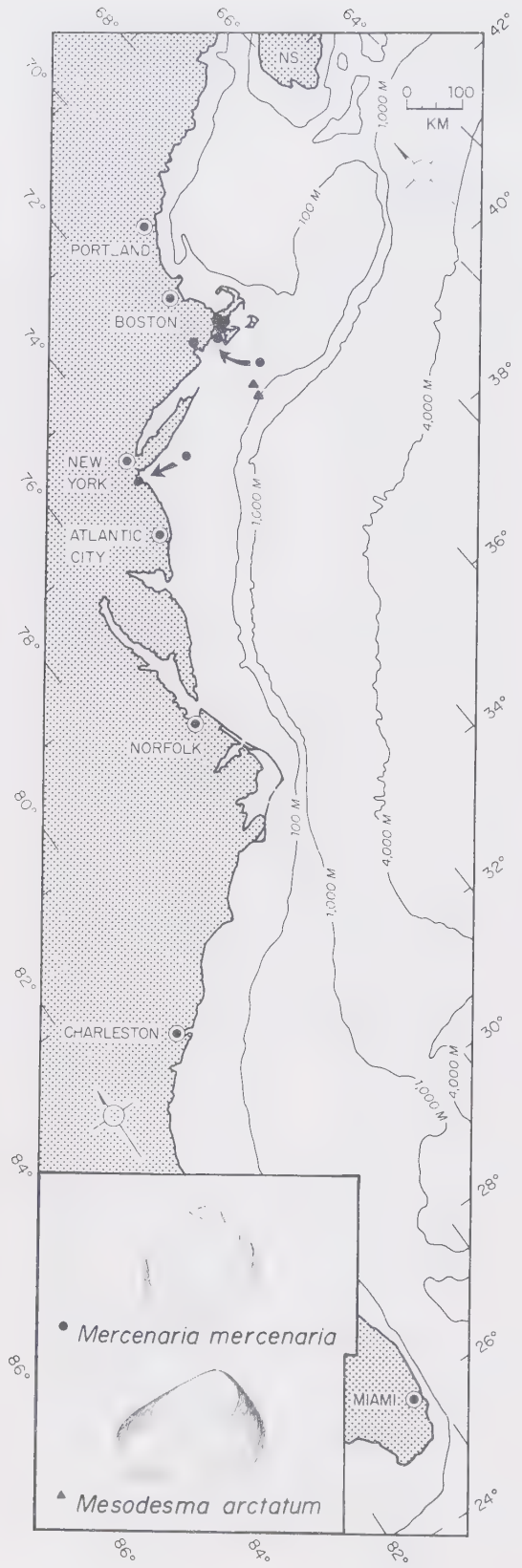

Figure 61.—Geographic distribution of *Mercenaria mercenaria* and *Mesodesma arctatum*.

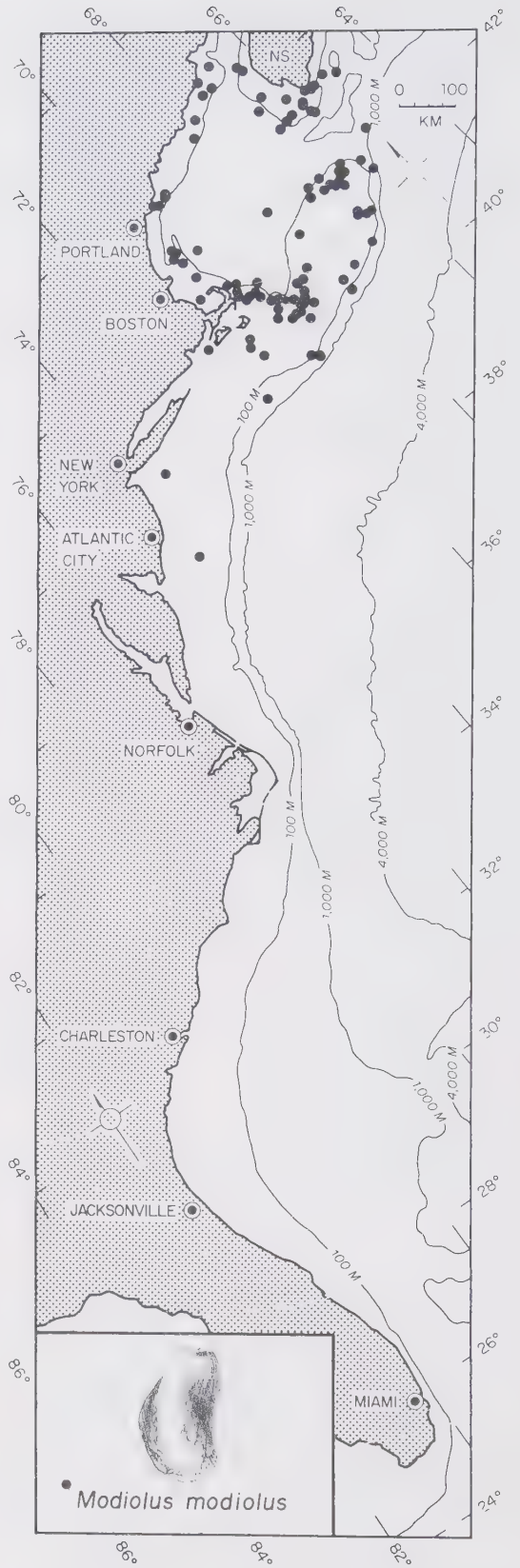

Figure 62.—Geographic distribution of *Modiolus modiolus*.

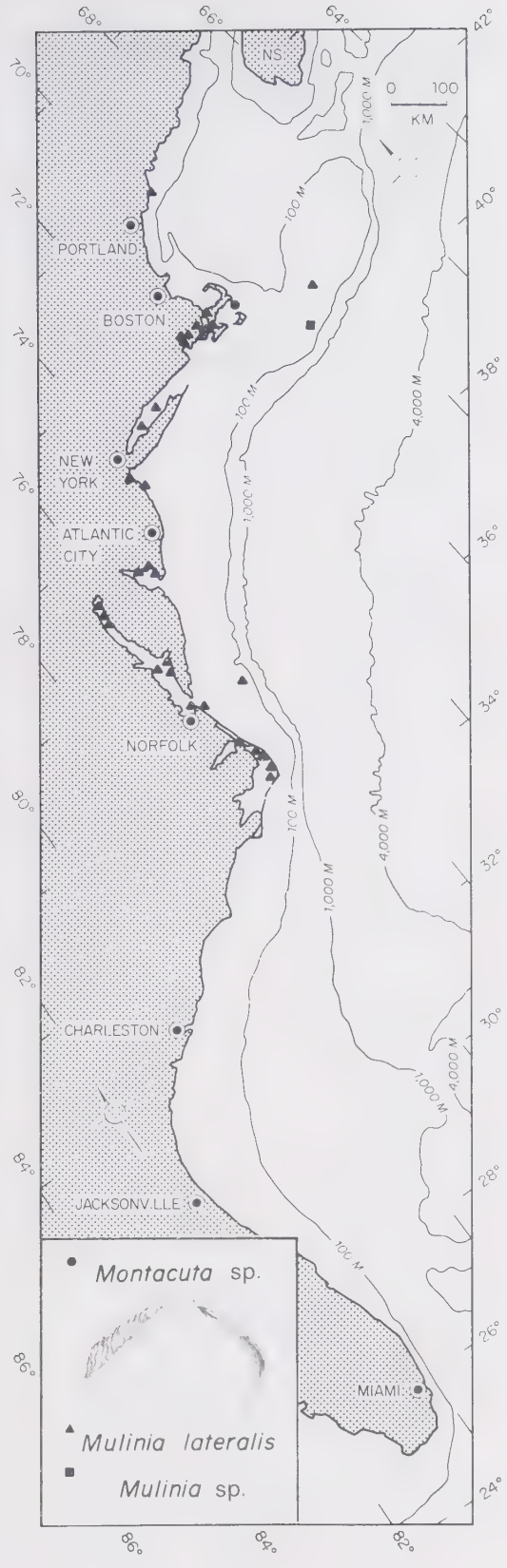

Figure 63.—Geographic distribution of *Montacuta* sp., *Mulinia lateralis*, and *Mulinia* sp.

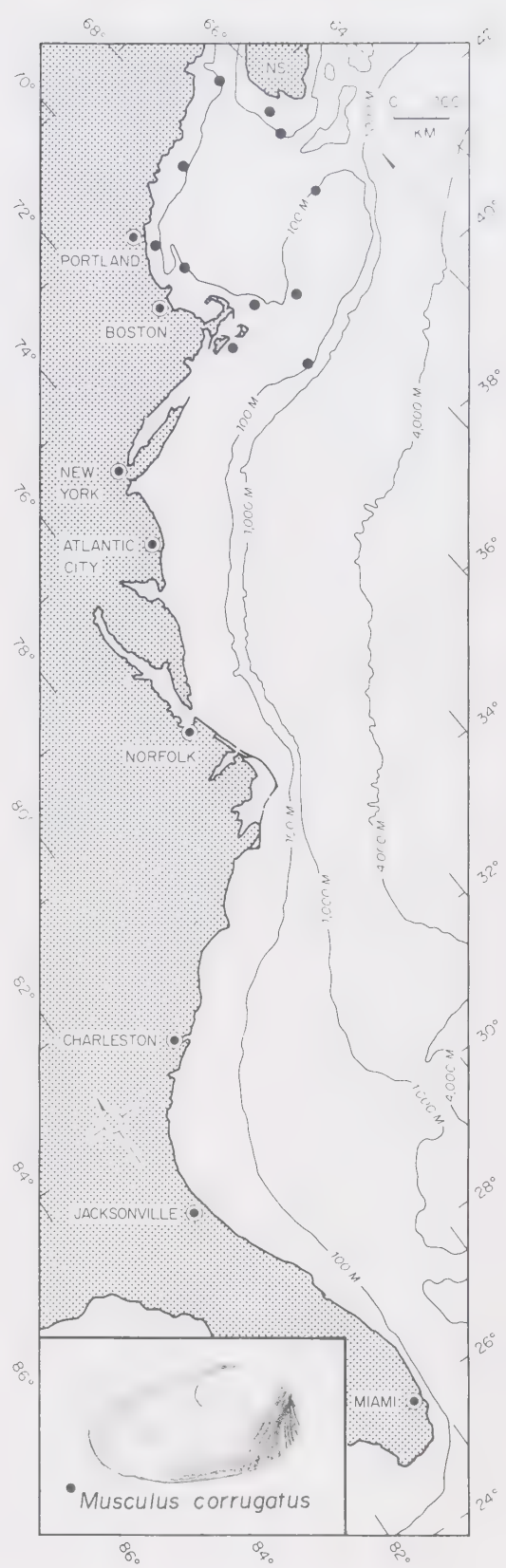

Figure 64.—Geographic distribution of *Musculus corrugatus*.

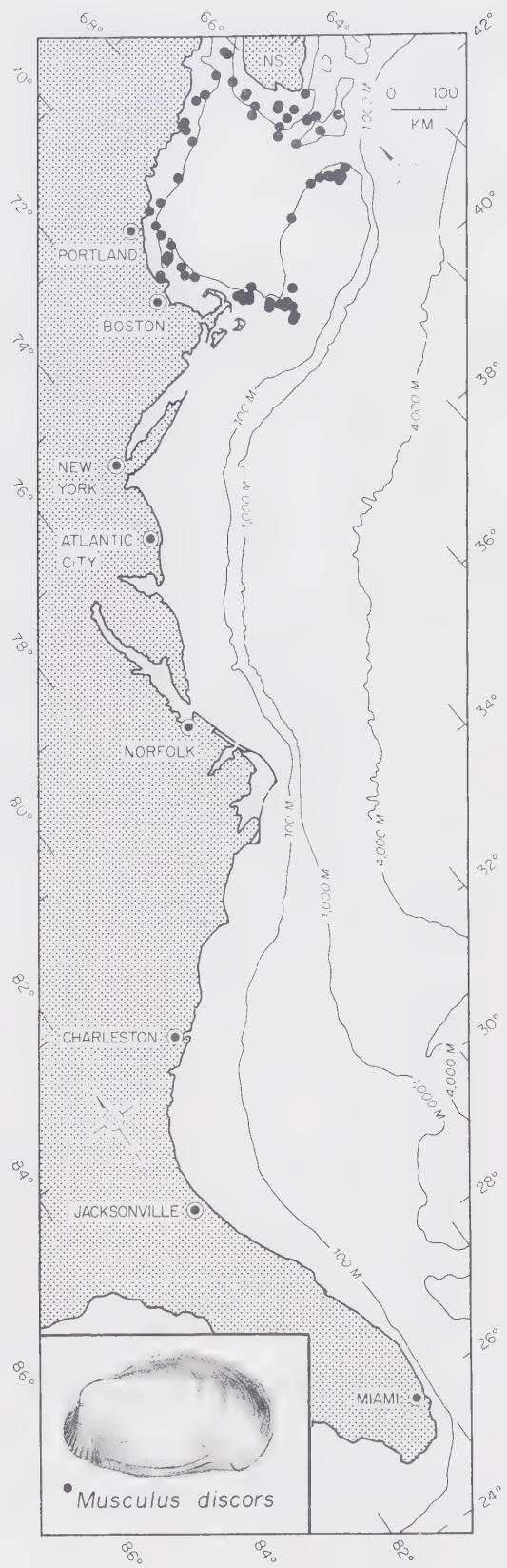

Figure 65.—Geographic distribution of *Musculus discors*.

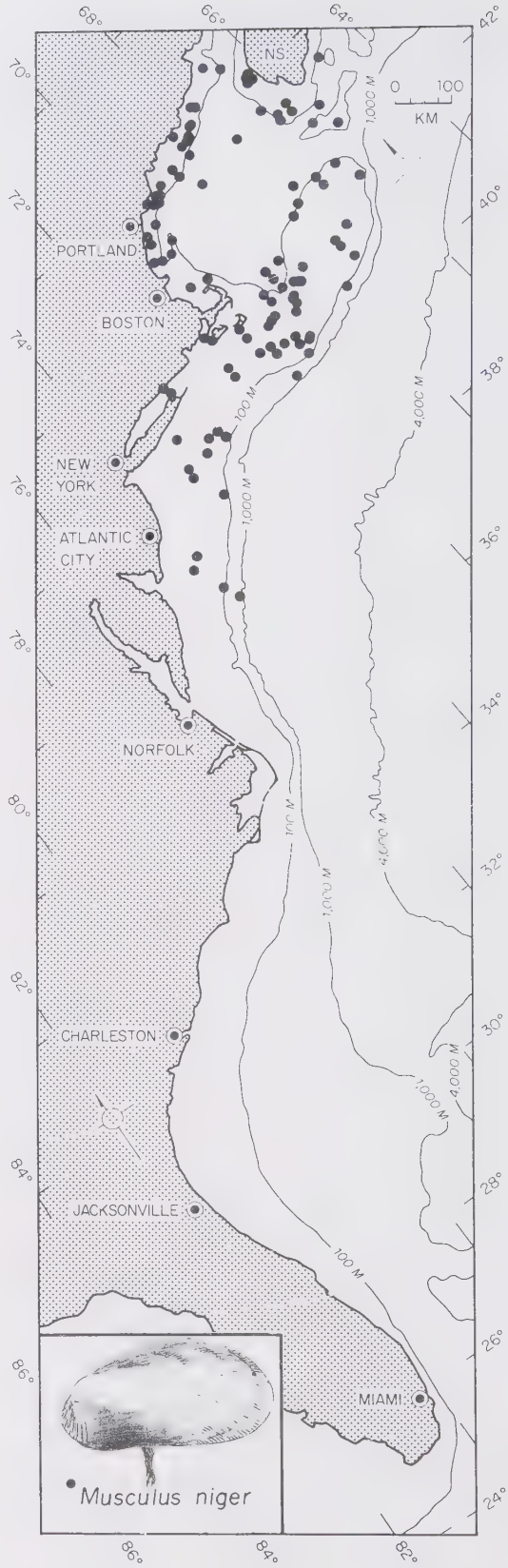

Figure 66.—Geographic distribution of *Musculus niger*.

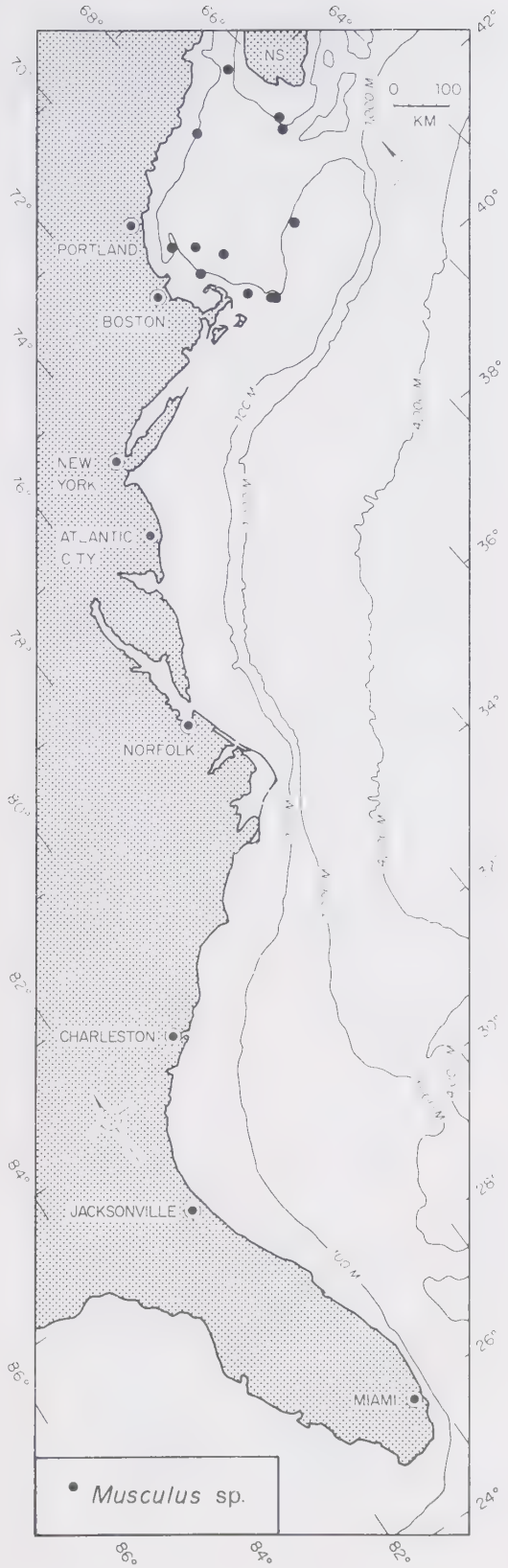

Figure 67.—Geographic distribution of *Musculus* sp.

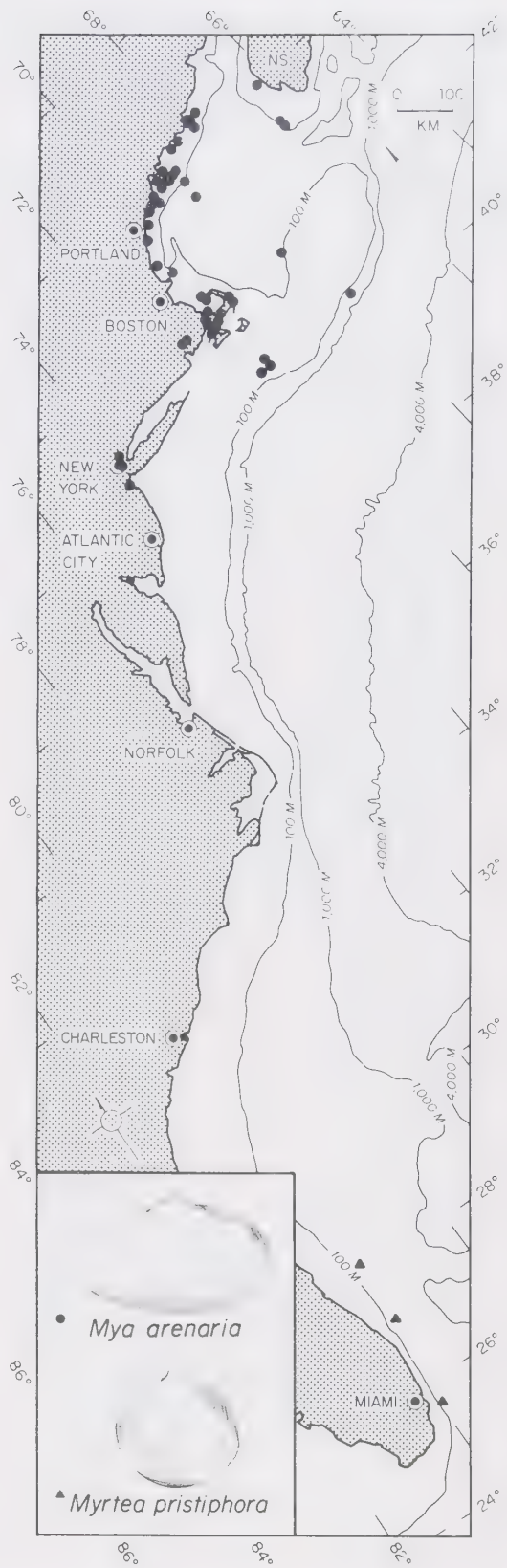

Figure 68.—Geographic distribution of *Mya arenaria and Myrtea pristiphora*.

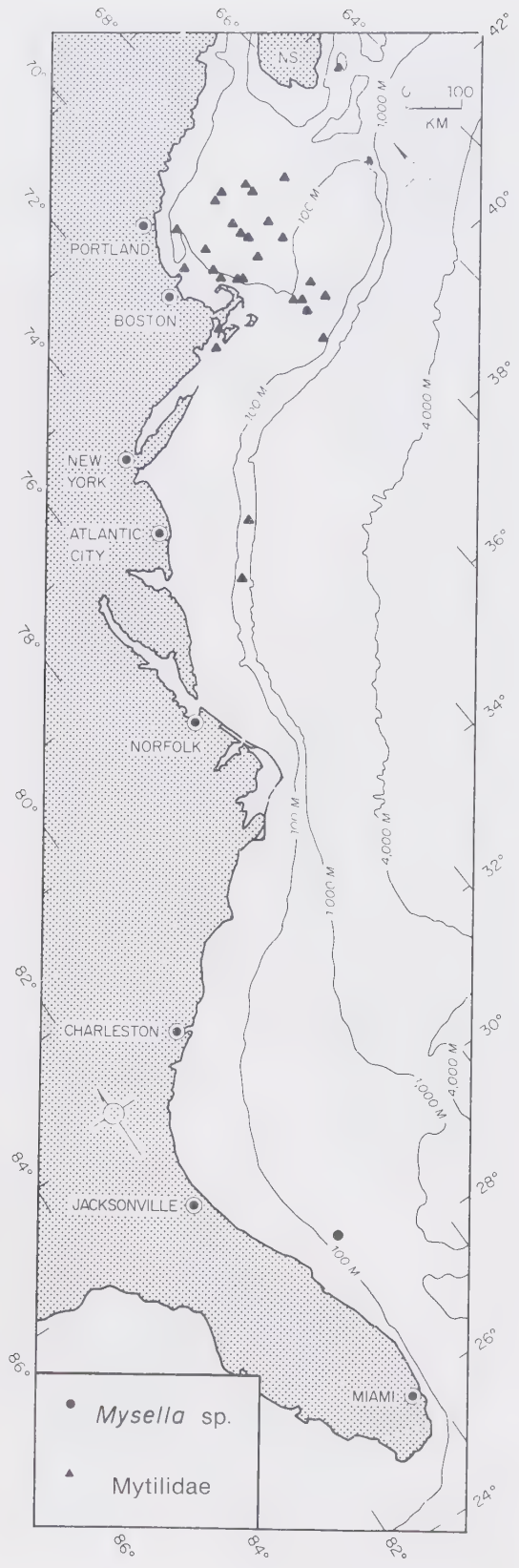

Figure 69.—Geographic distribution of *Mysella* sp. and Mytilidae.

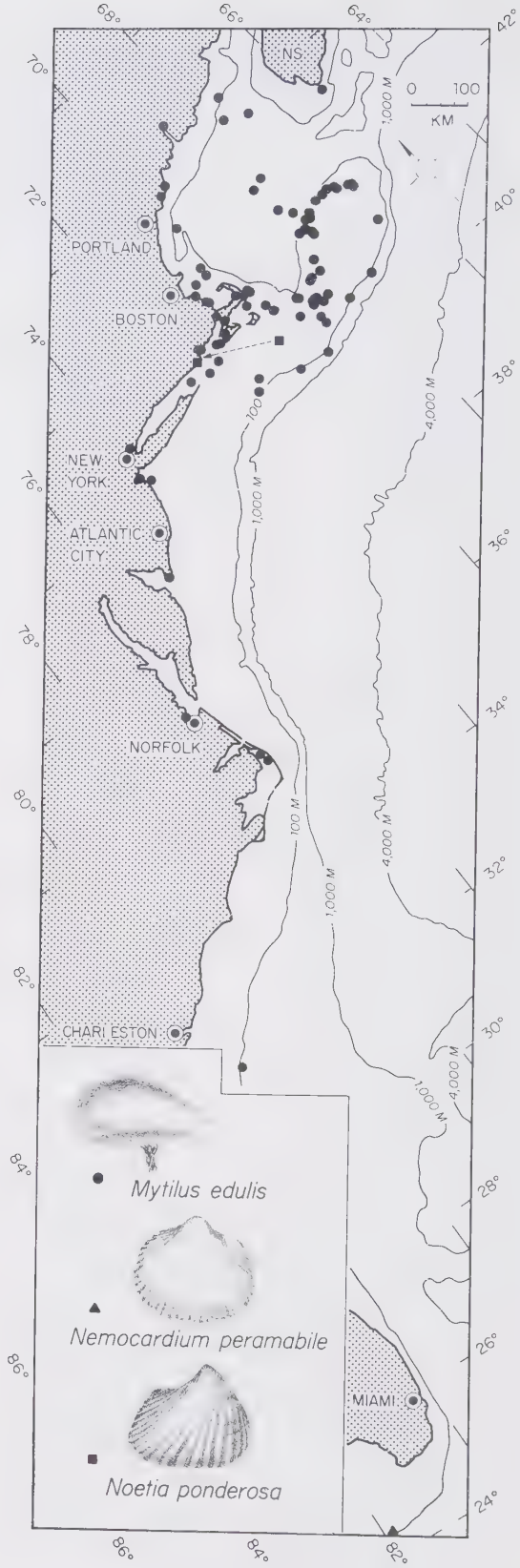

Figure 70.—Geographic distribution of *Mytilus edulis*, *Nemocardium peramabile*, and *Noetia ponderosa*.

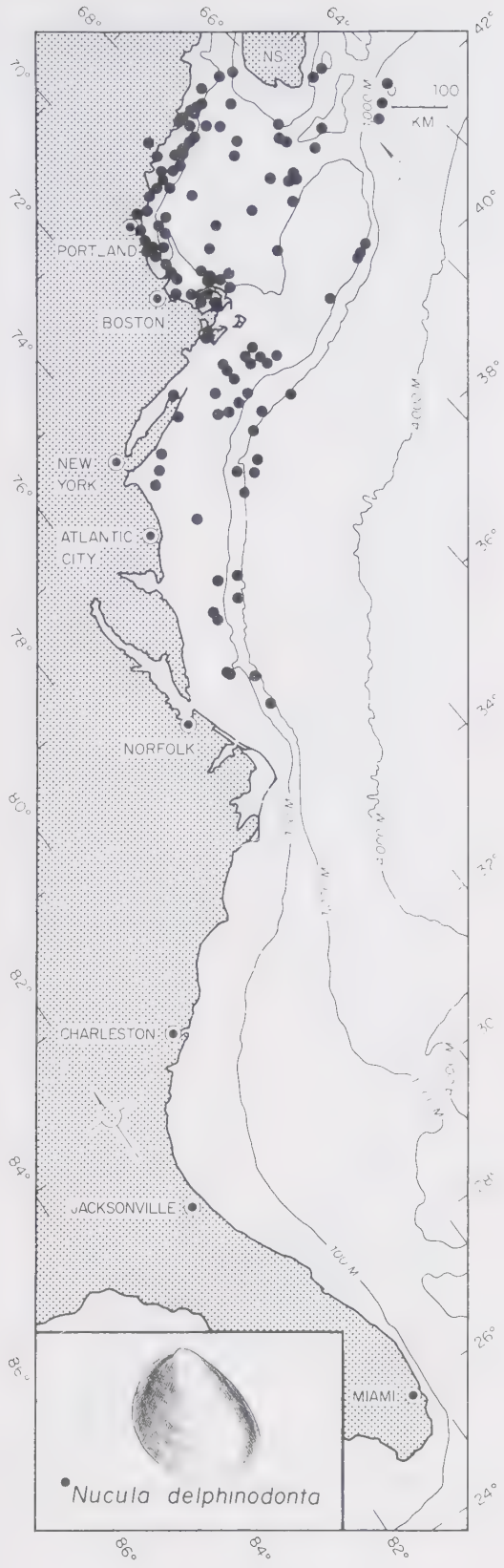

Figure 71.—Geographic distribution of *Nucula delphinodonta*.

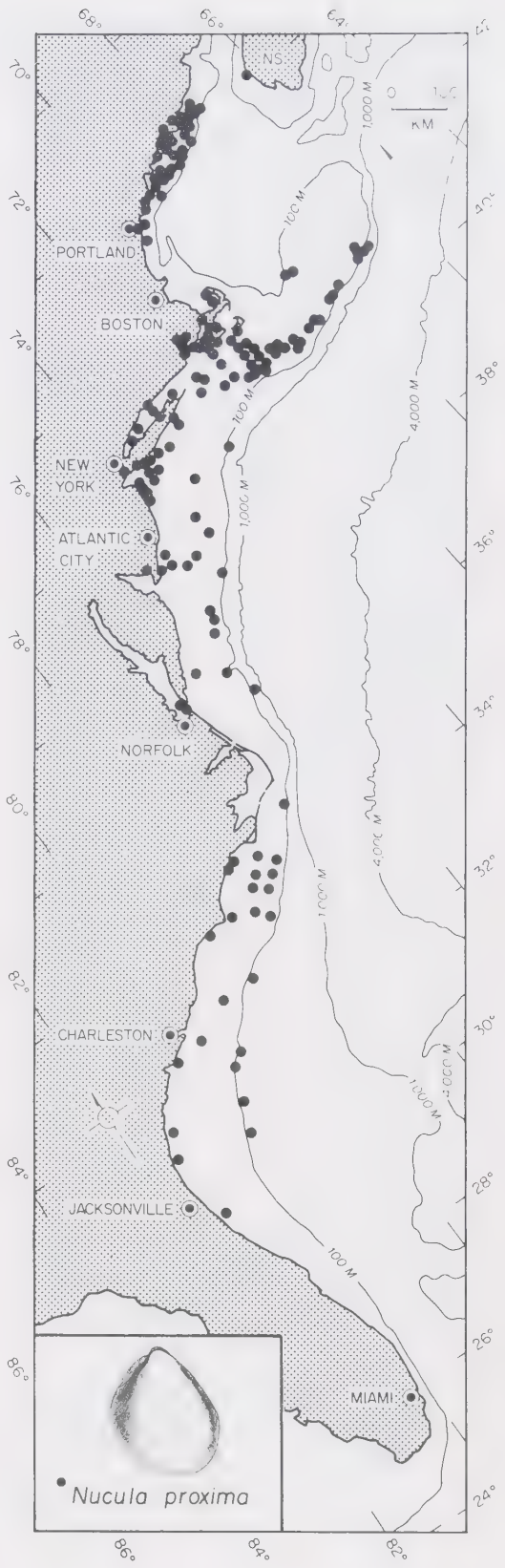

Figure 72.—Geographic distribution of *Nucula proxima*.

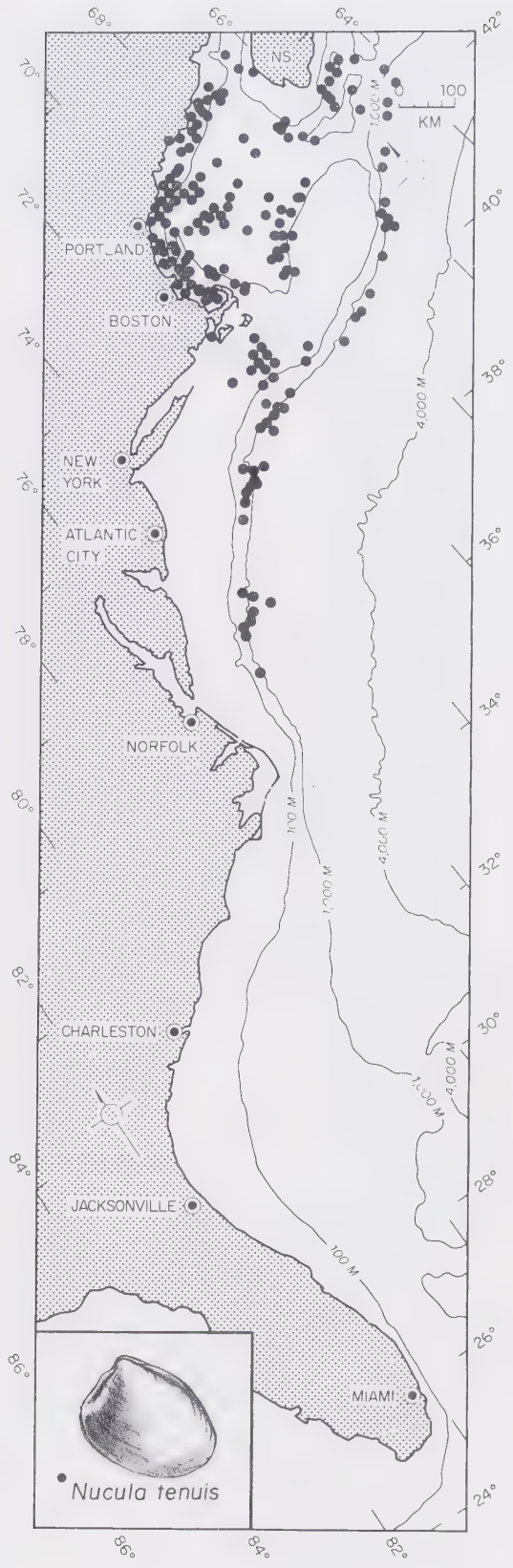

Figure 73.—Geographic distribution of *Nucula tenuis*.

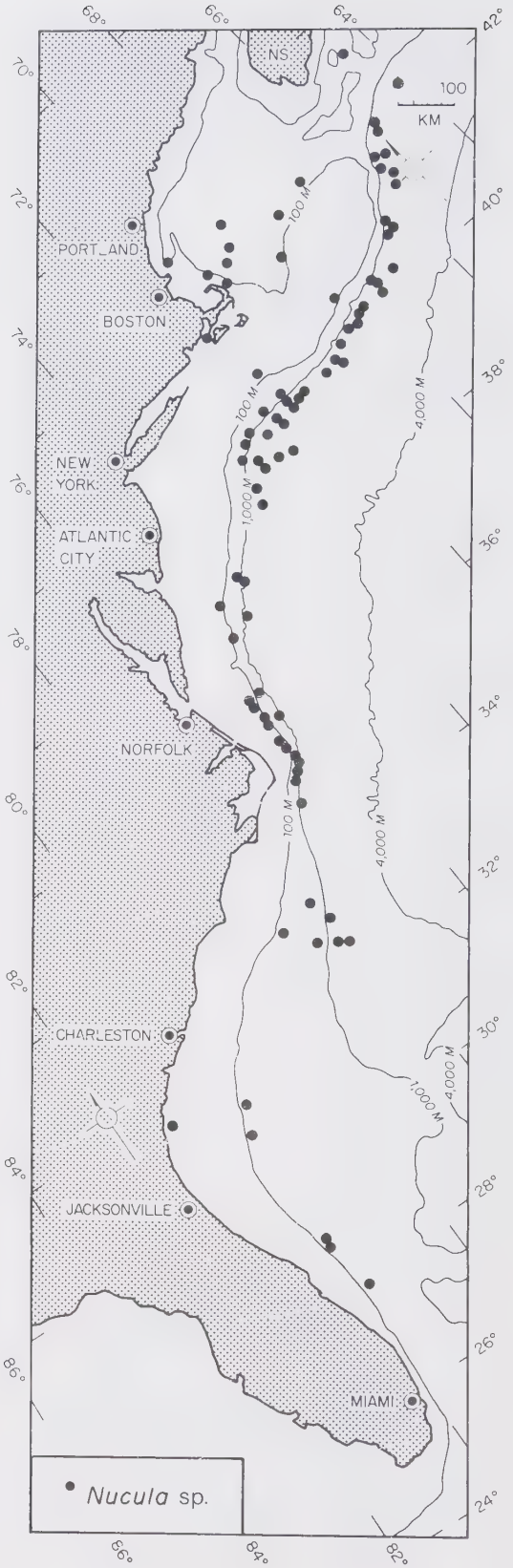

Figure 74.—Geographic distribution of *Nucula* sp.

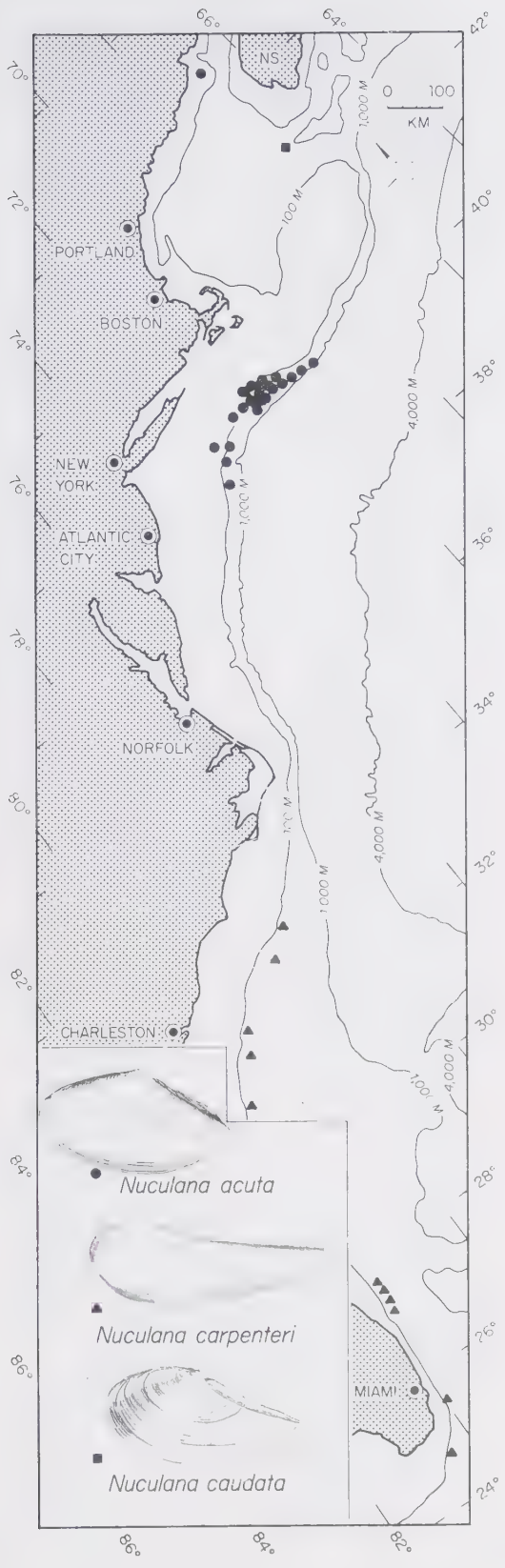

Figure 75.—Geographic distribution of *Nuculana acuta*, *Nuculana carpenteri*, and *Nuculana caudata*.

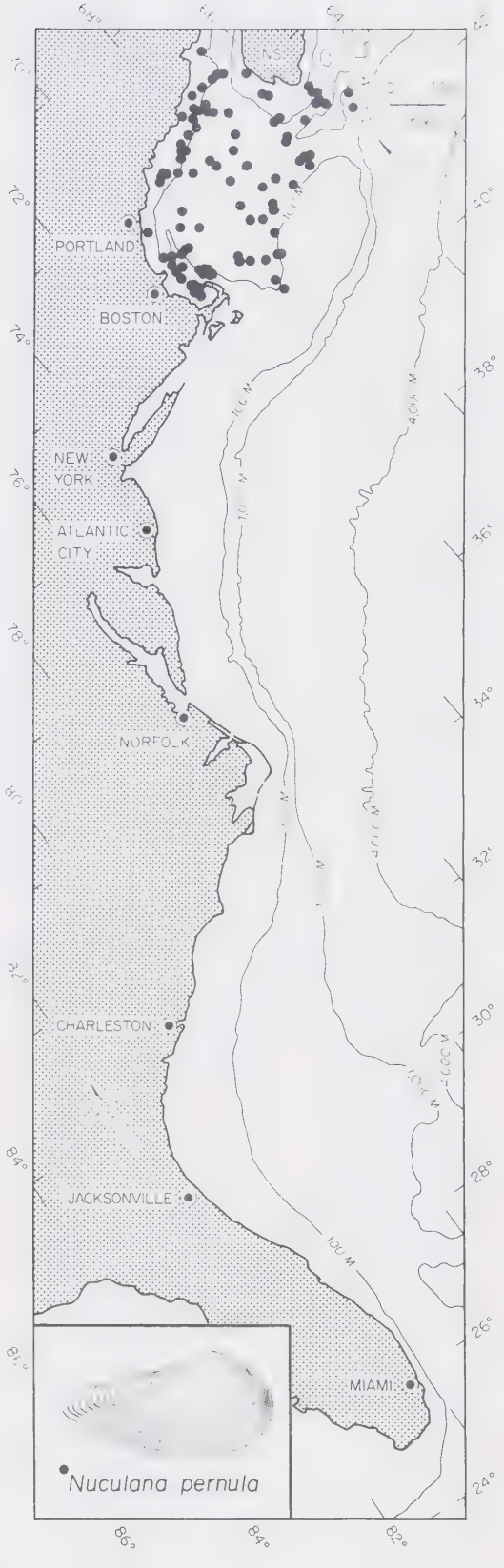

Figure 76.—Geographic distribution of *Nuculana pernula*.

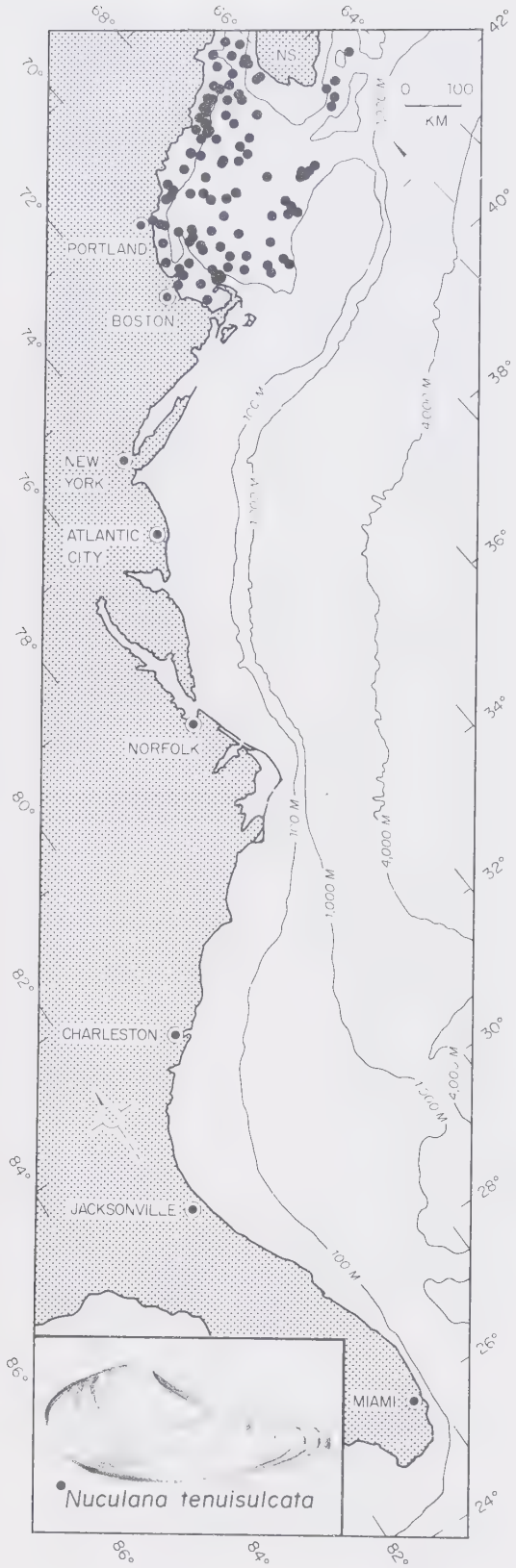

Figure 77.—Geographic distribution of *Nuculana tenuisulcata*.

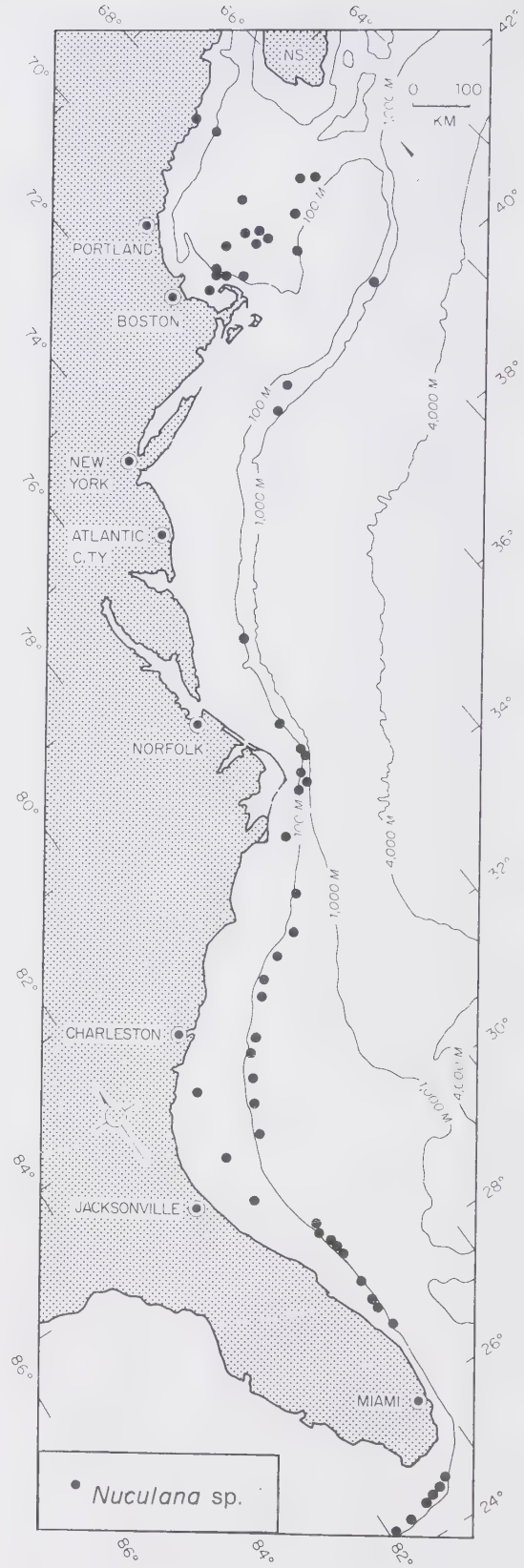

Figure 78.—Geographic distribution of *Nuculana* sp.

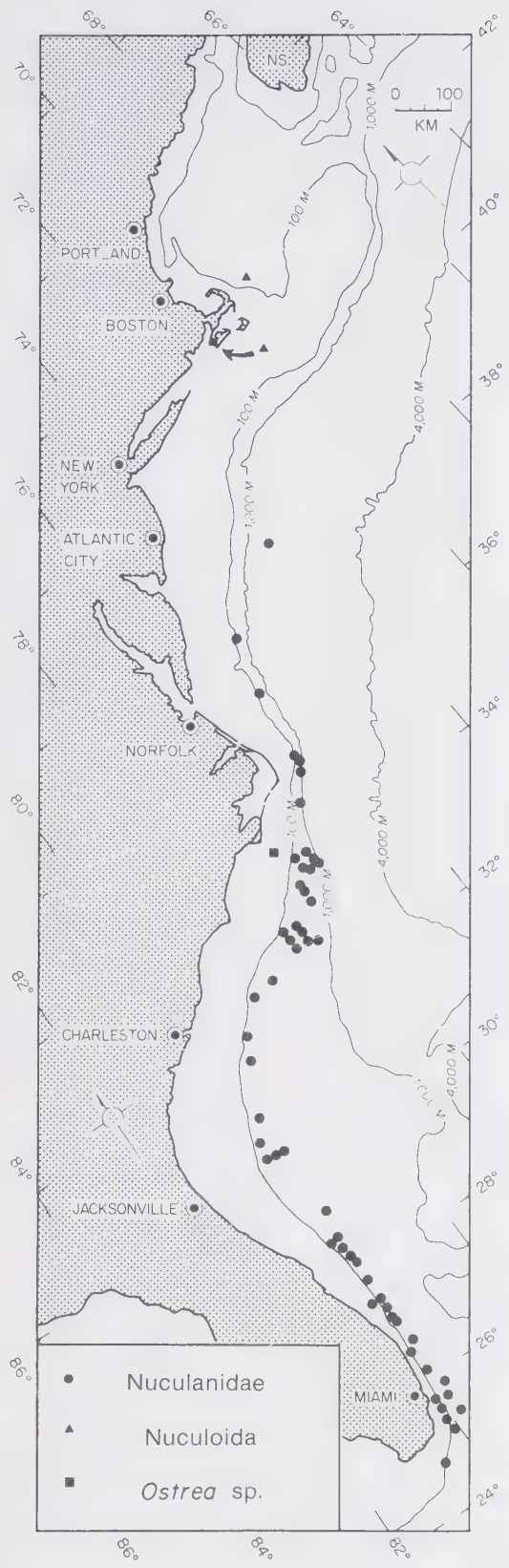

Figure 79.—Geographic distribution of Nuculanidae, Nuculoida, and *Ostrea* sp.

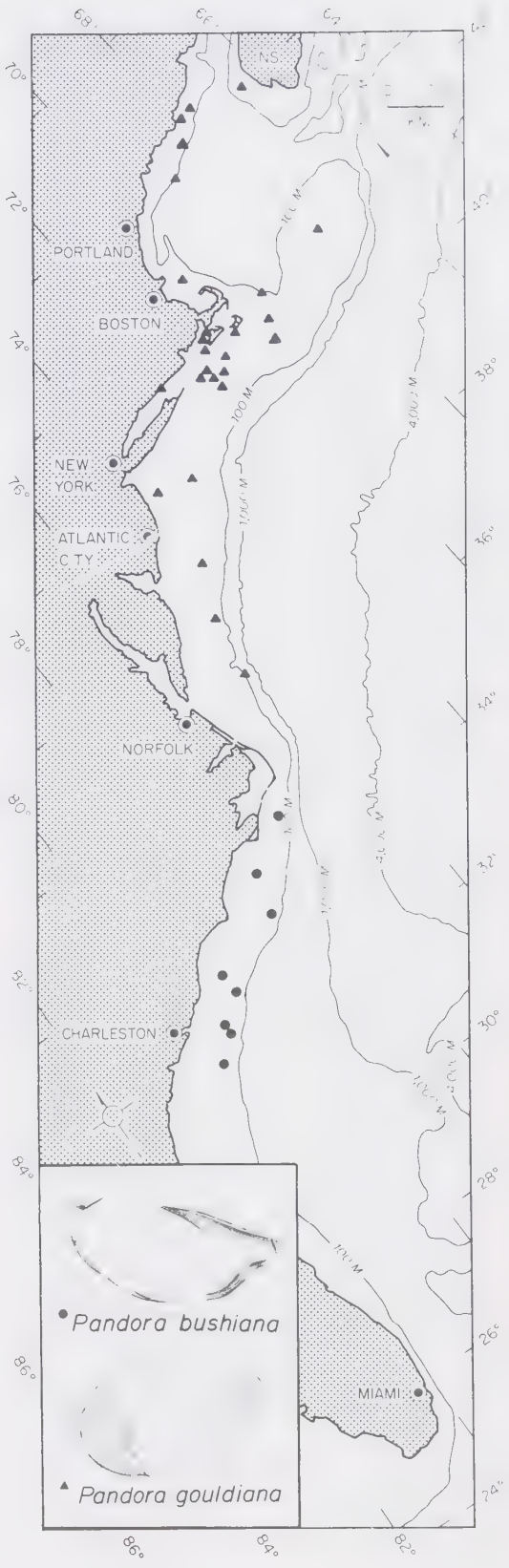

Figure 80.—Geographic distribution of *Pandora bushiana* and *Pandora gouldiana*.

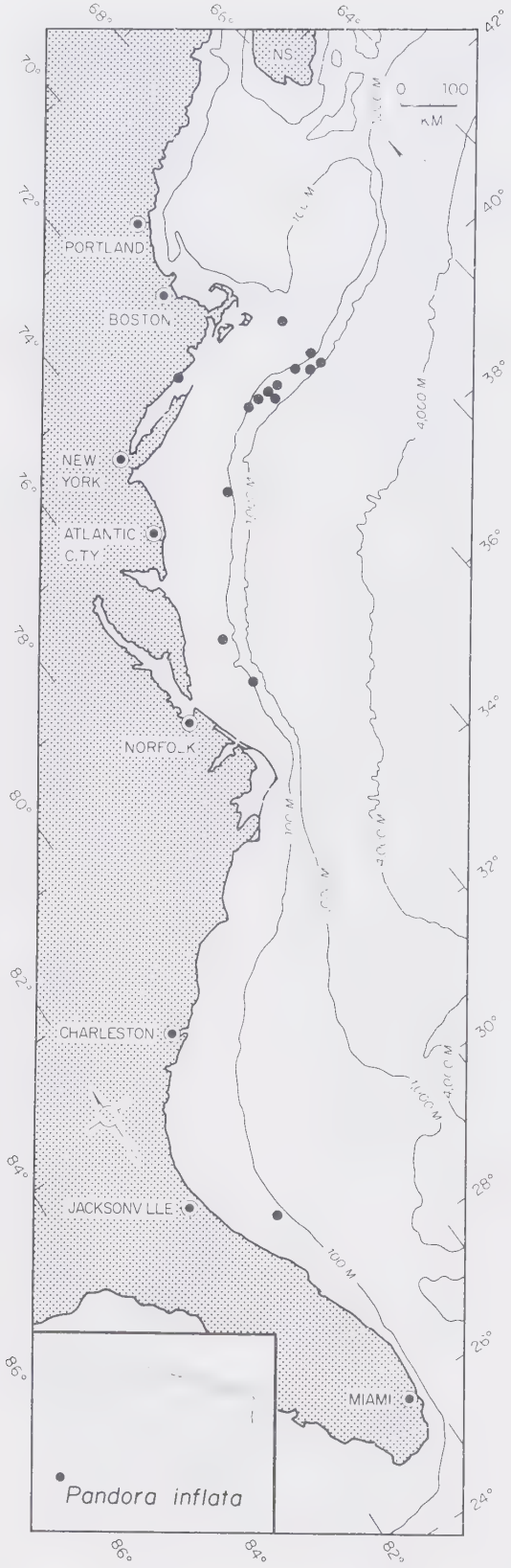

Figure 81.—Geographic distribution of *Pandora inflata*.

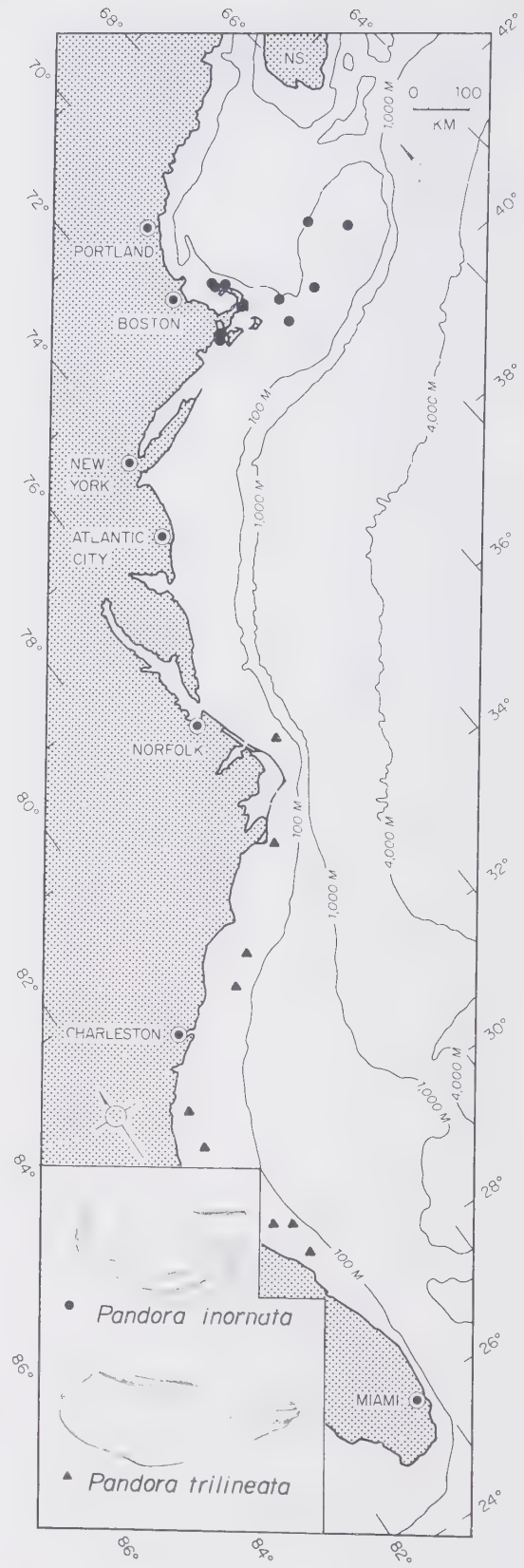

Figure 82.—Geographic distribution of *Pandora inornata* and *Pandora trilineata*.

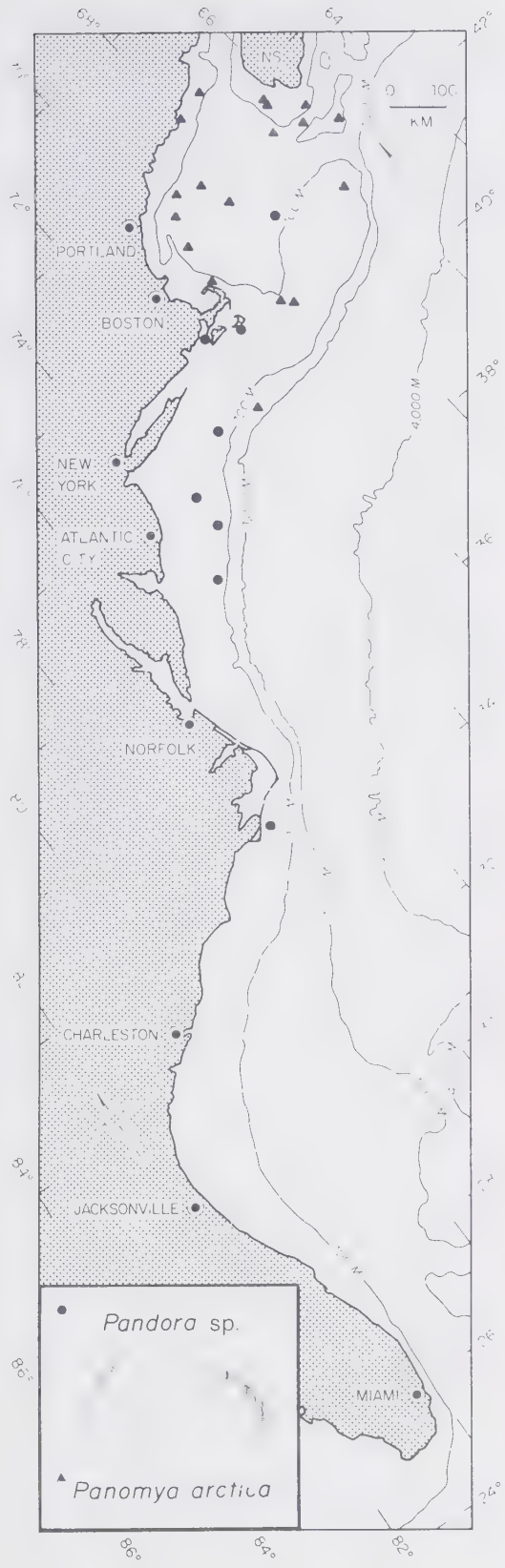

Figure 83.—Geographic distribution of *Pandora* sp. and *Panomya arctica*.

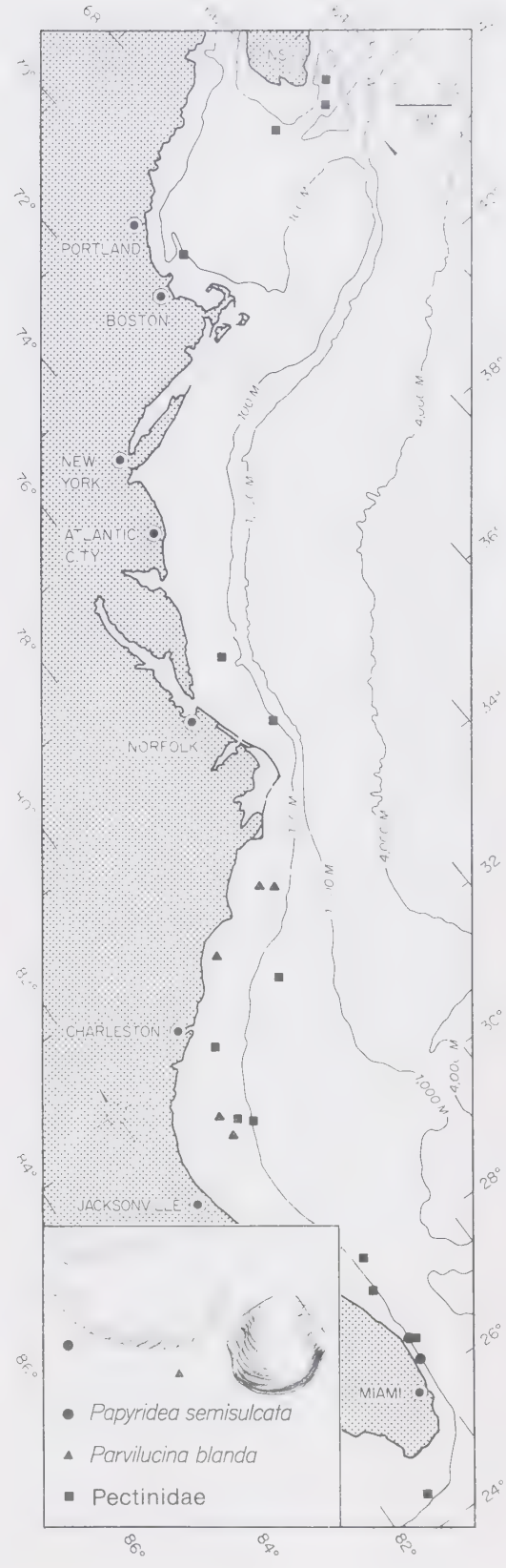

Figure 84.—Geographic distribution of *Papyridea semisulcata*, *Parvilucina blanda*, and Pectinidae.

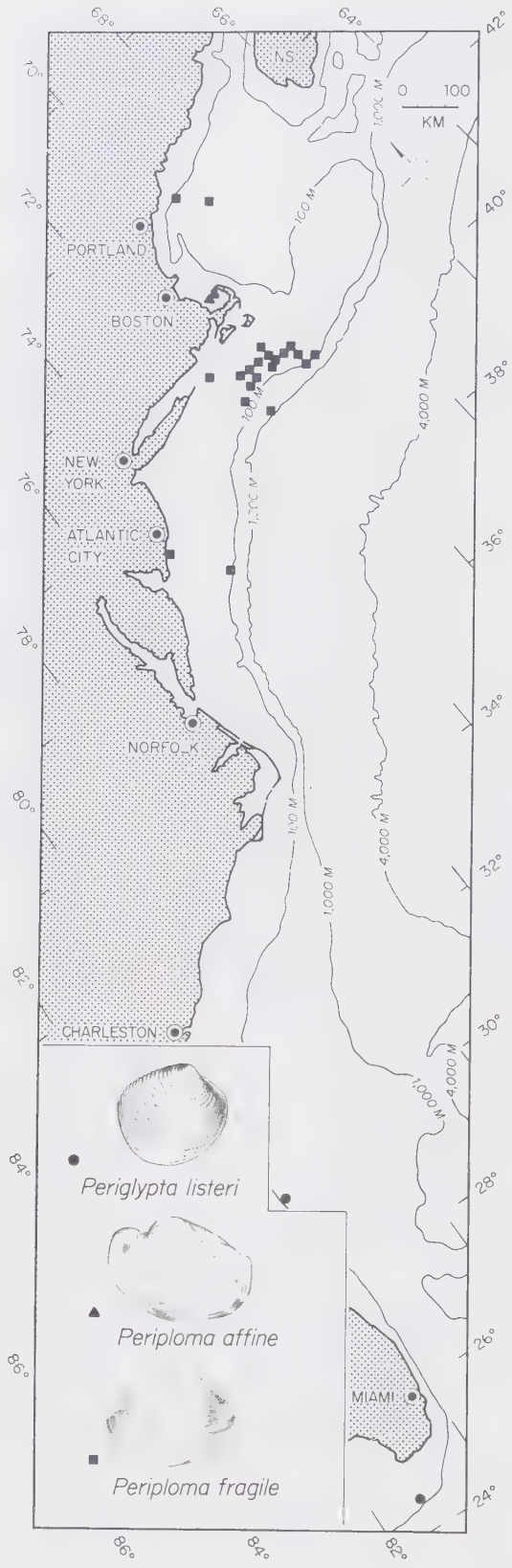

Figure 85.—Geographic distribution of *Periglypta listeri*, *Periploma affine*, and *Periploma fragile*.

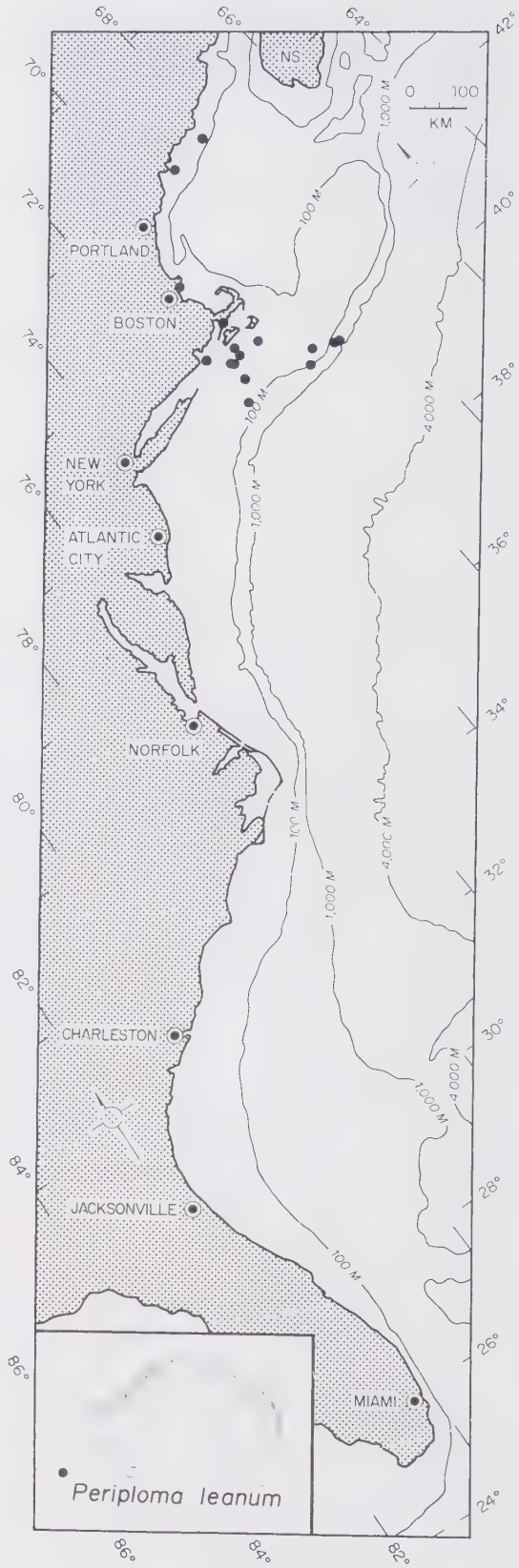

Figure 86.—Geographic distribution of *Periploma leanum*.

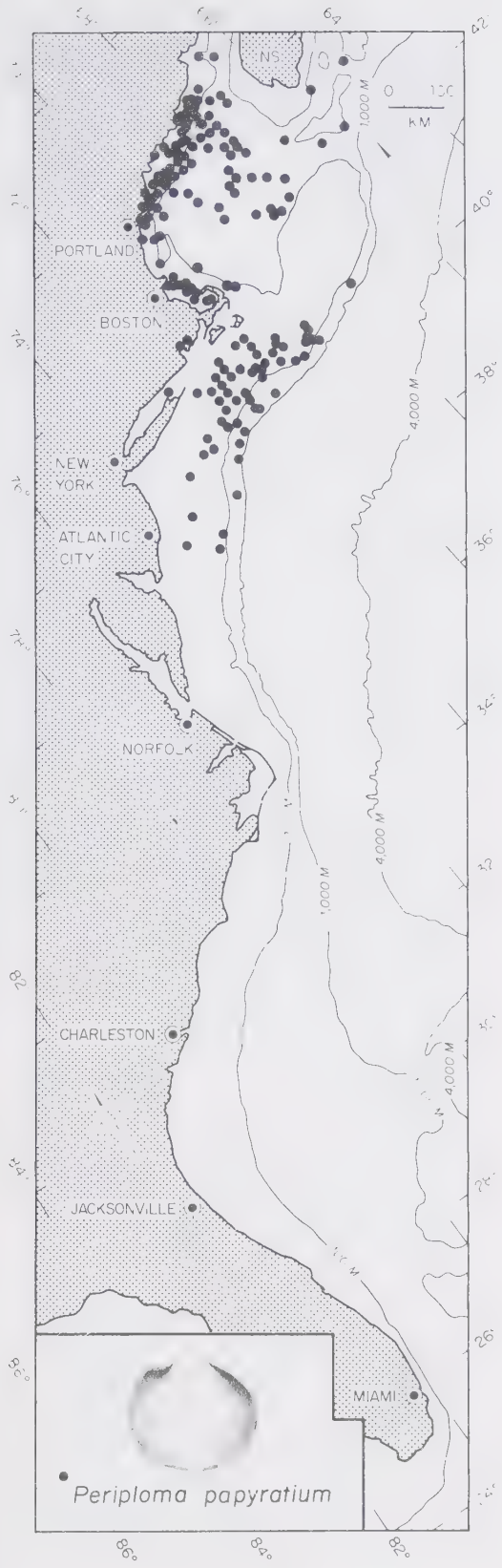

Figure 87.—Geographic distribution of *Periploma papyratium*.

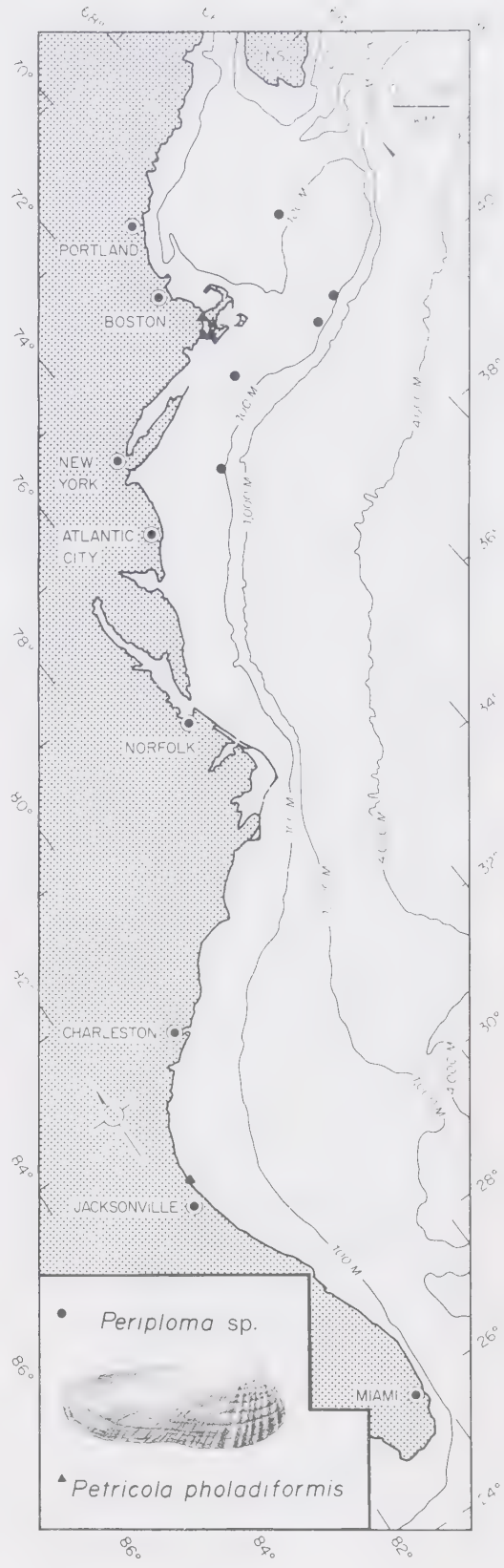

Figure 88.—Geographic distribution of *Periploma* sp. and *Petricola pholadiformis*.

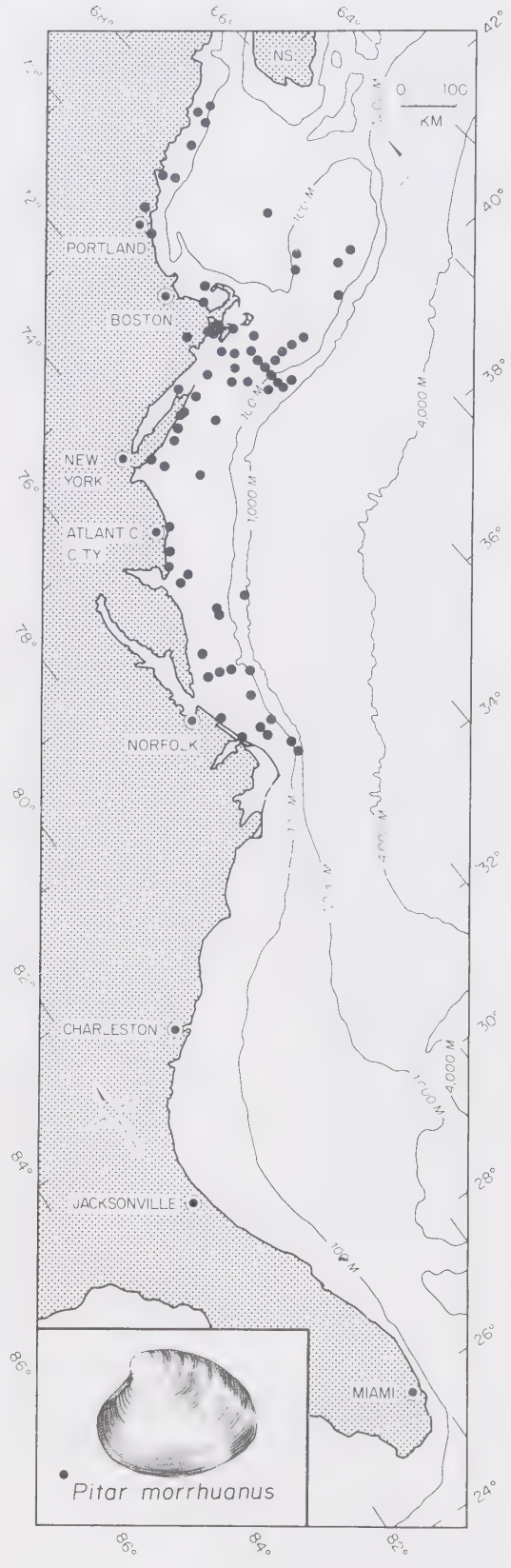

Figure 89.—Geographic distribution of *Pitar morrhuanus*.

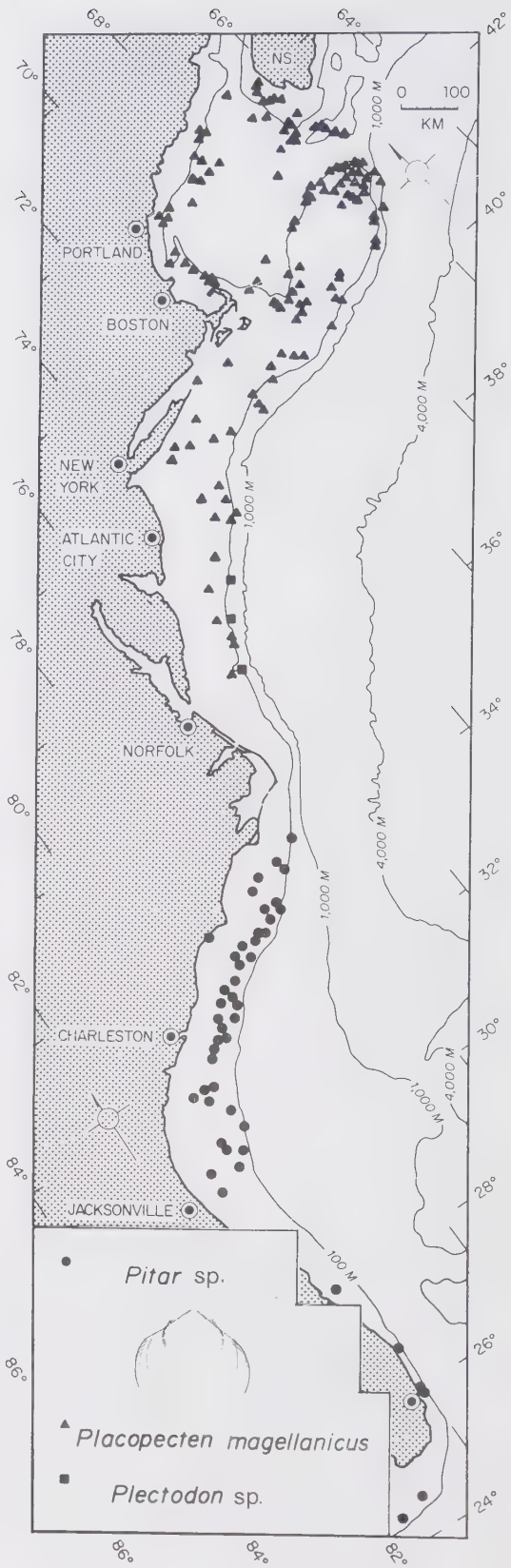

Figure 90.—Geographic distribution of *Pitar* sp., *Placopecten magellanicus*, and *Plectodon* sp.

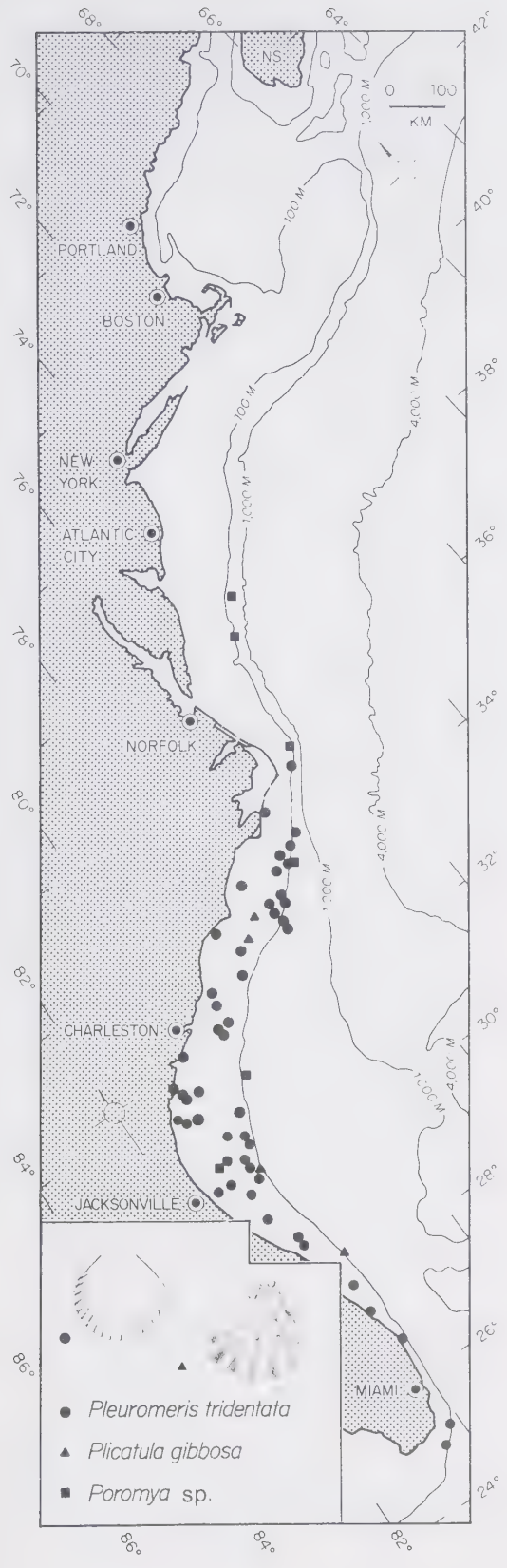

Figure 91.—Geographic distribution of *Pleuromeris tridentata*, *Plicatula gibbosa*, and *Poromya* sp.

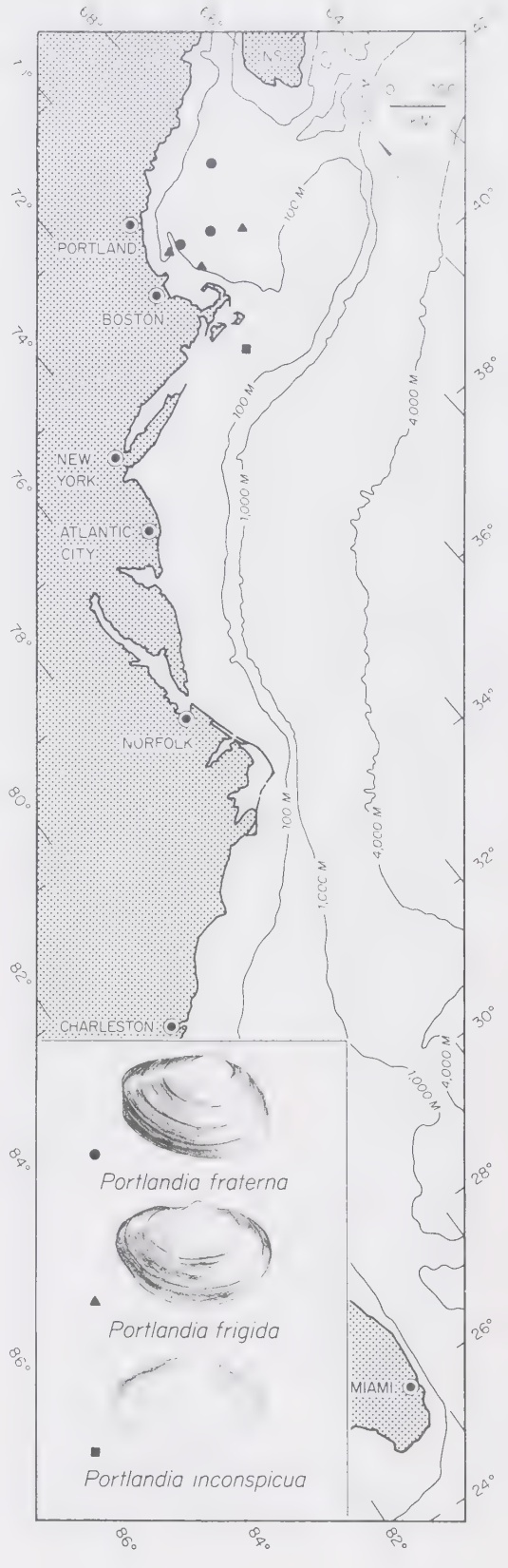

Figure 92.—Geographic distribution of *Portlandia fraterna*, *Portlandia frigida*, and *Portlandia inconspicua*.

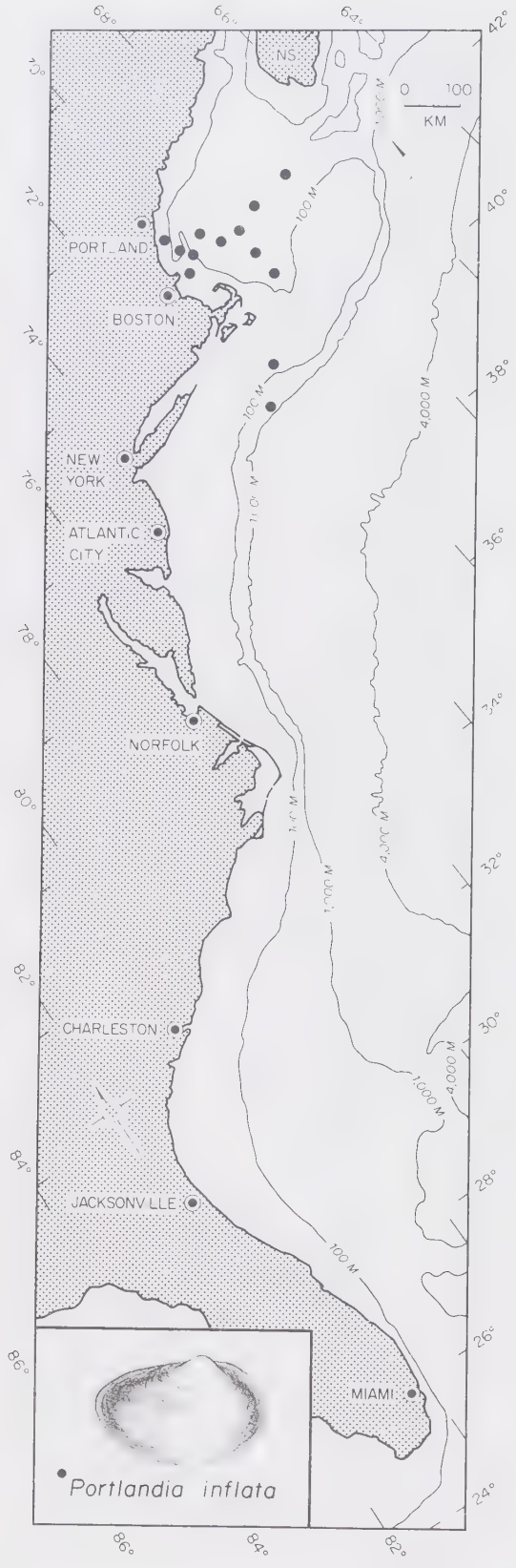

Figure 93.—Geographic distribution of *Portlandia inflata*.

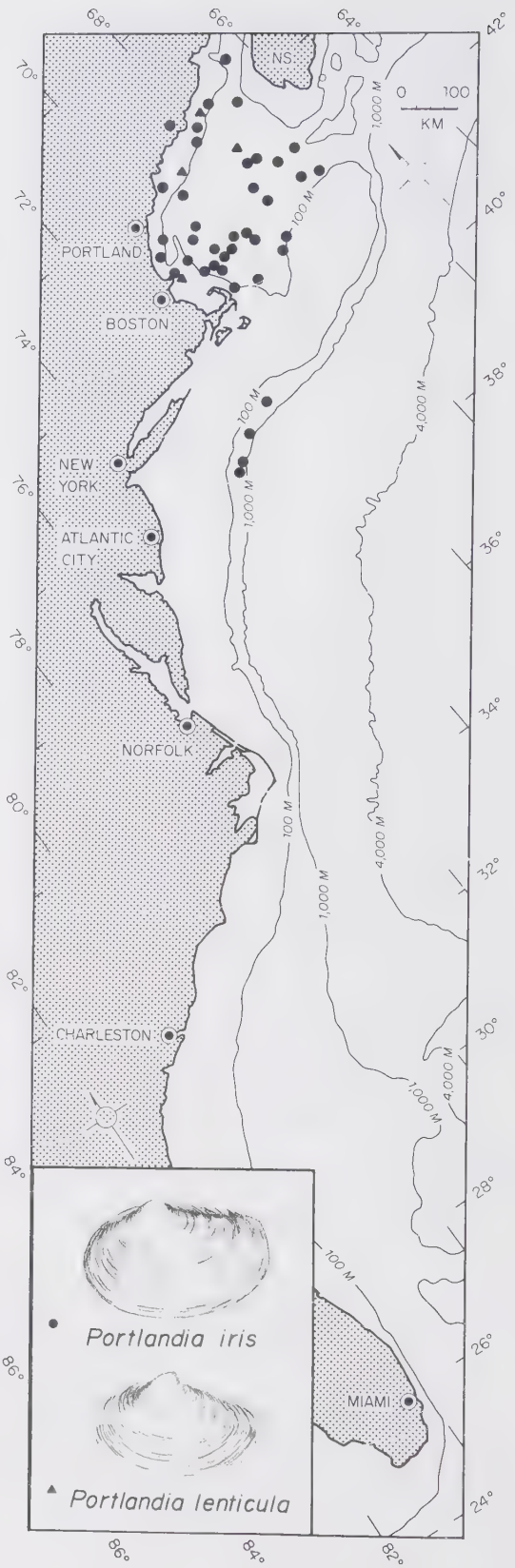

Figure 94.—Geographic distribution of *Portlandia iris* and *Portlandia lenticula*.

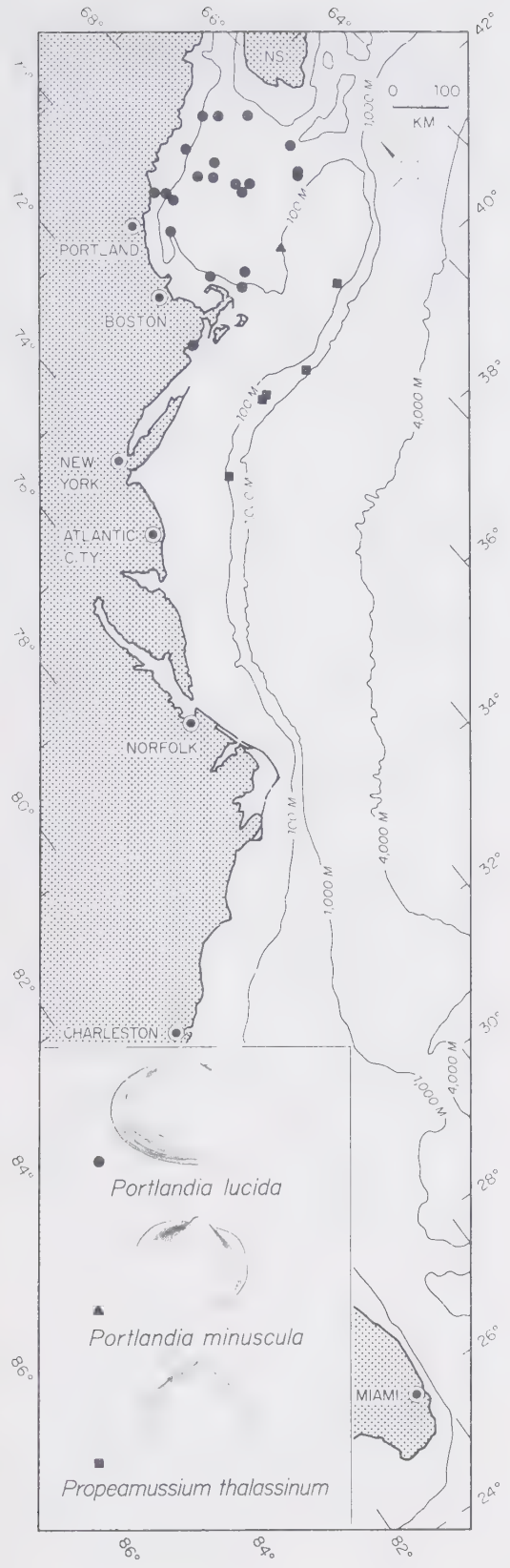

Figure 95.—Geographic distribution of *Portlandia lucida*, *Portlandia minuscula*, and *Propeamussium thalassinum*.

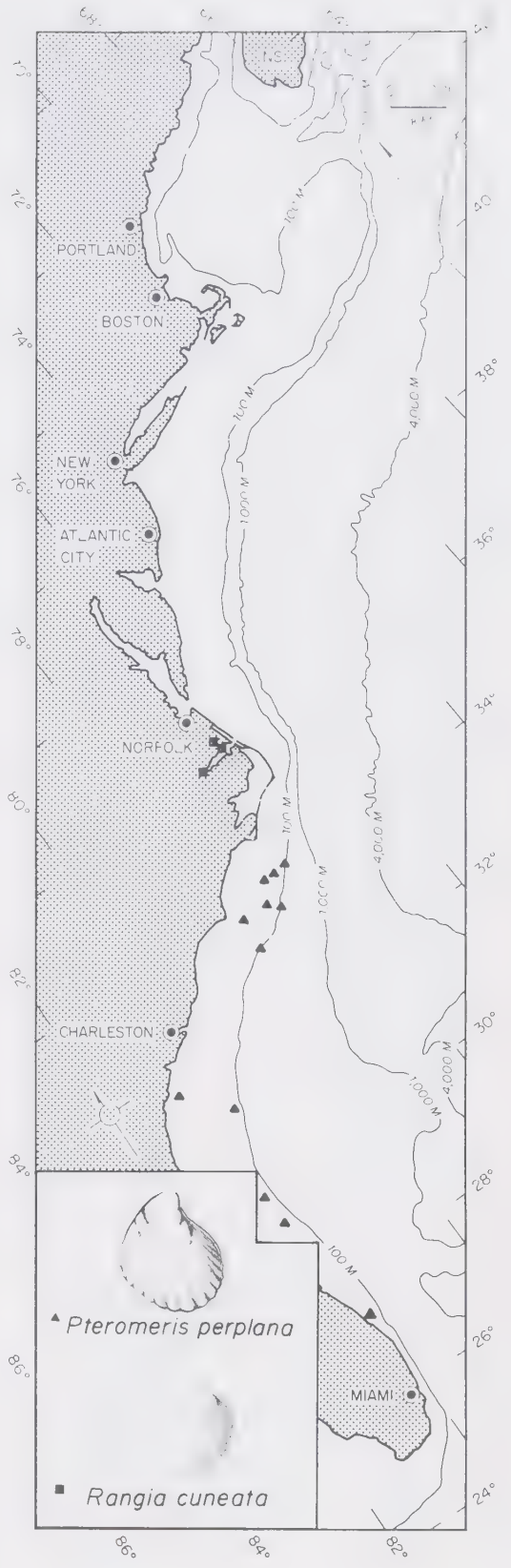

Figure 96.—Geographic distribution of *Pteromeris perplana* and *Rangia cuneata*.

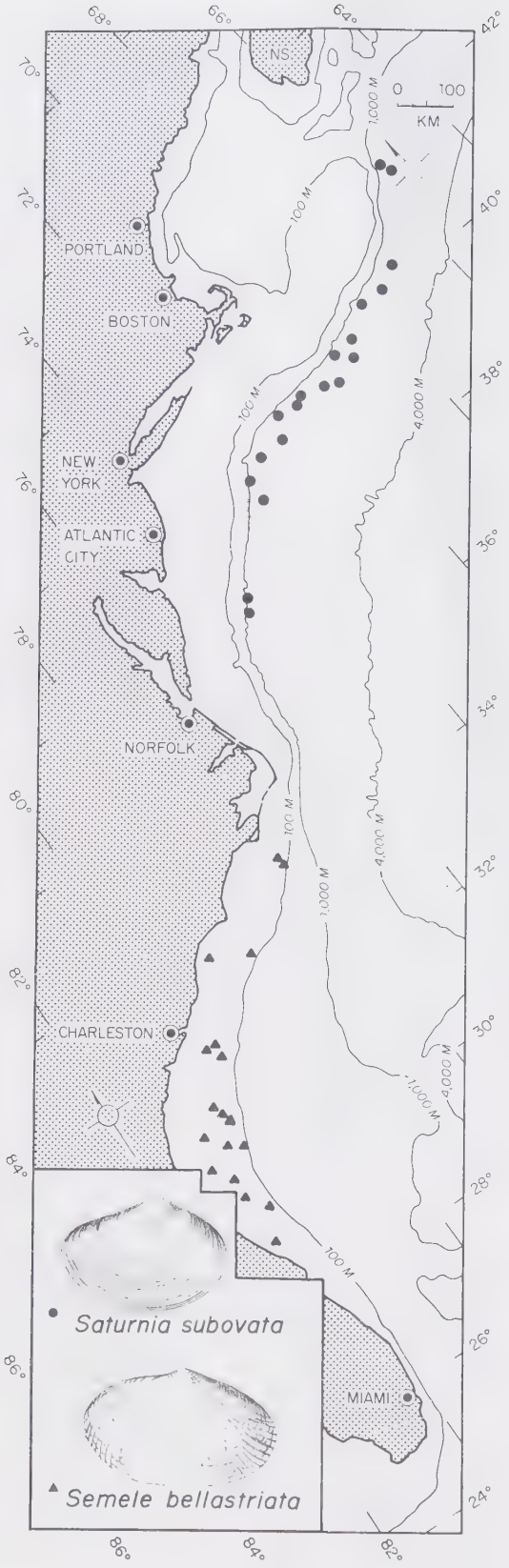

Figure 97.—Geographic distribution of *Saturnia subovata* and *Semele bellastriata*.

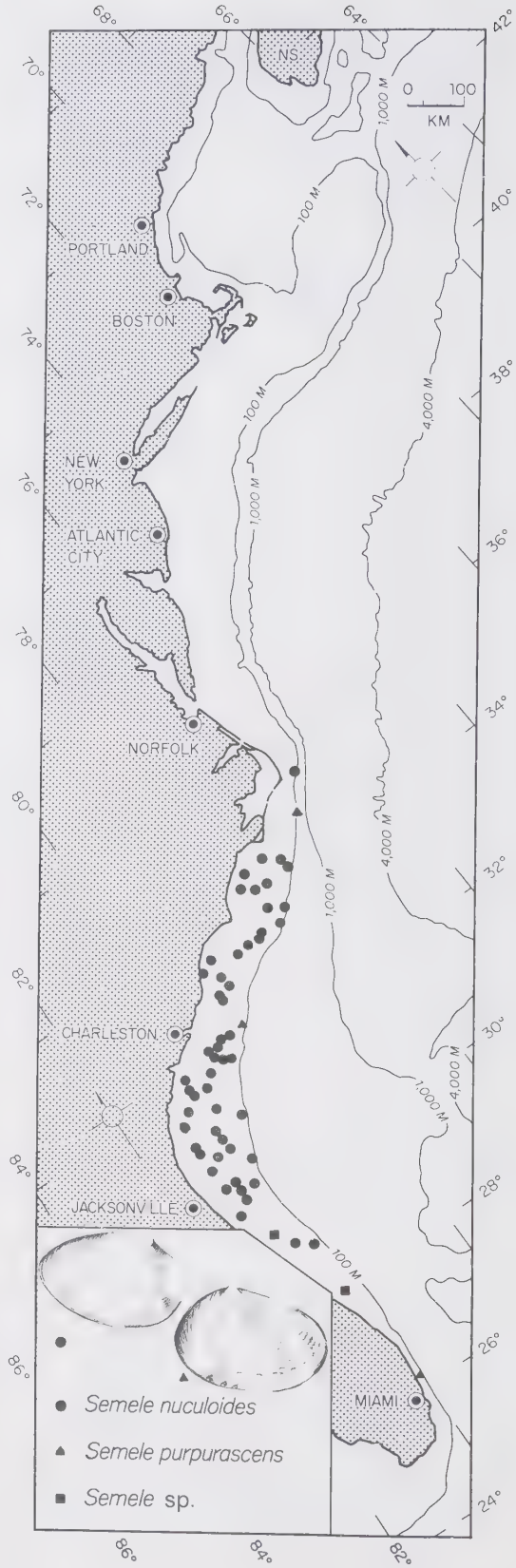

Figure 98.—Geographic distribution of *Semele nu* and *Semele*

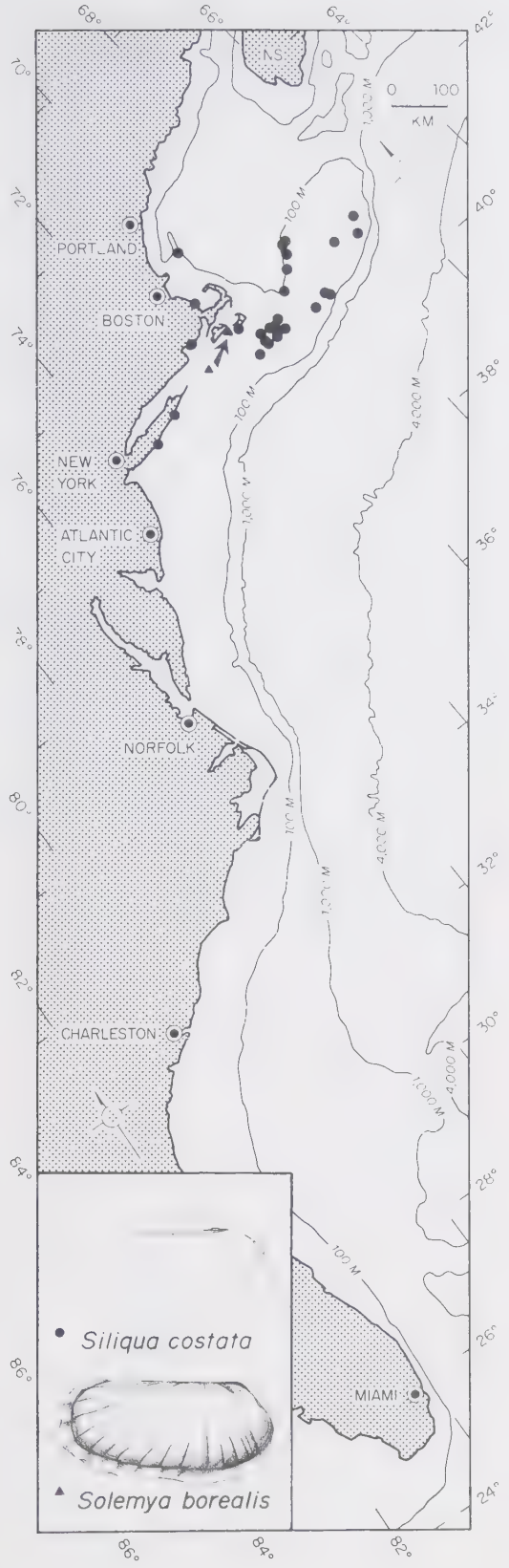

Figure 99.—Geographic distribution of *Siliqua costata* and *Solemya borealis*.

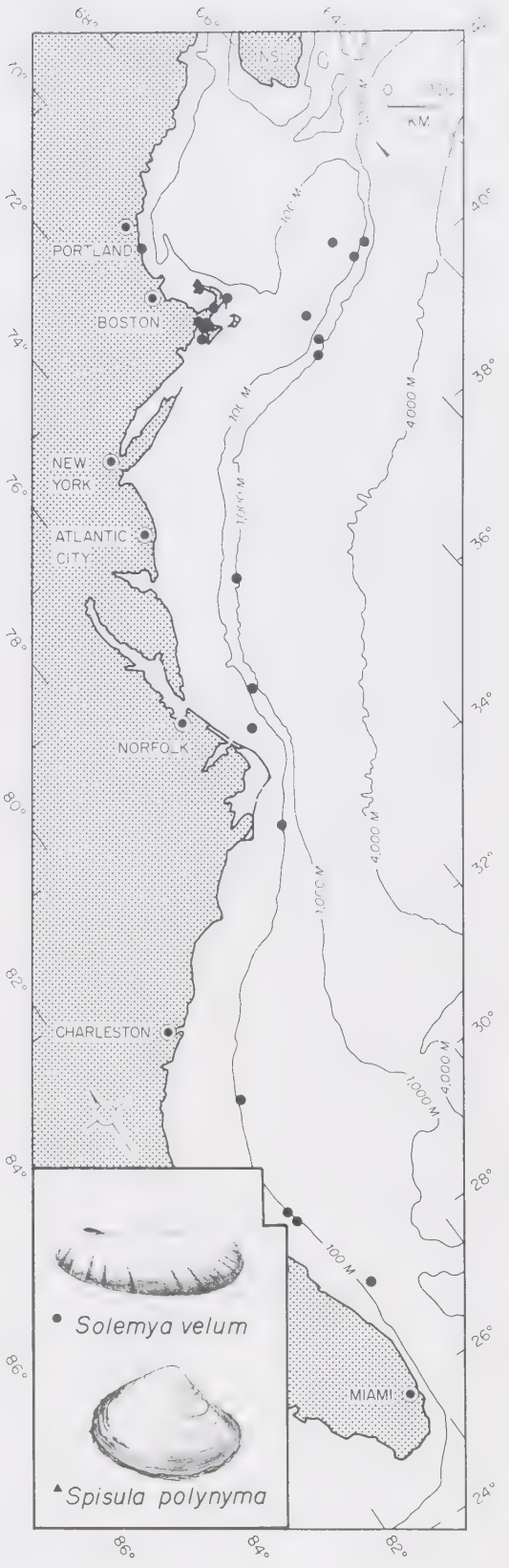

Figure 100.—Geographic distribution of *Solemya velum* and *Spisula polynyma*.

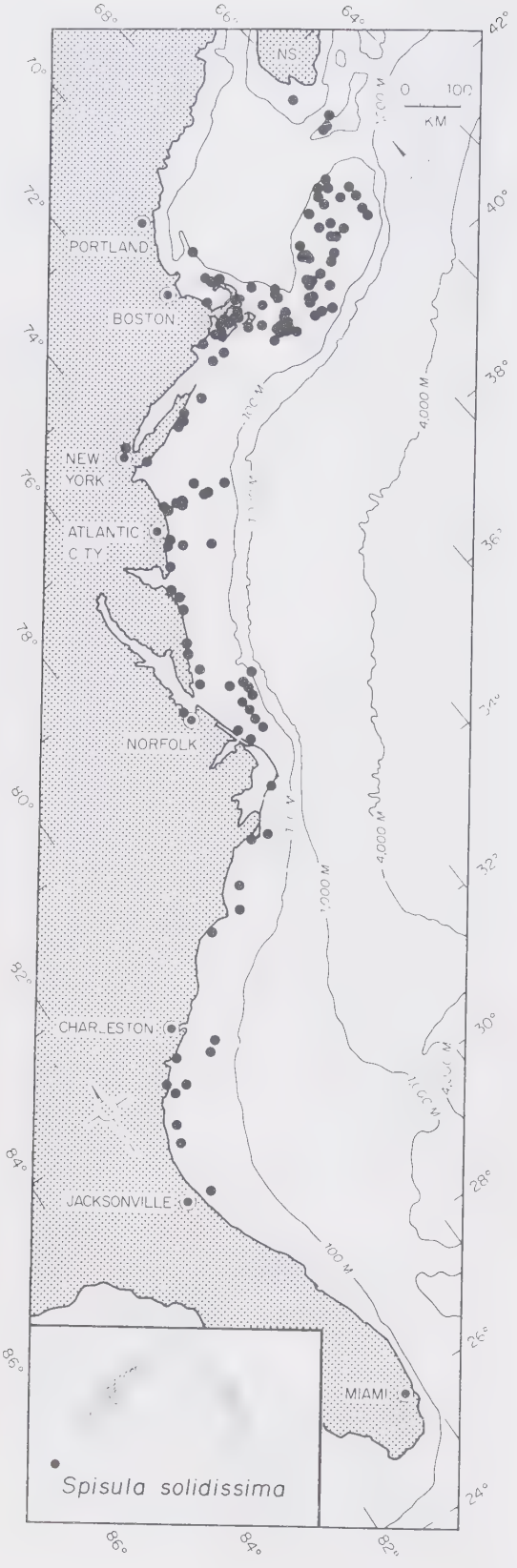

Figure 101.—Geographic distribution of *Spisula solidissima*.

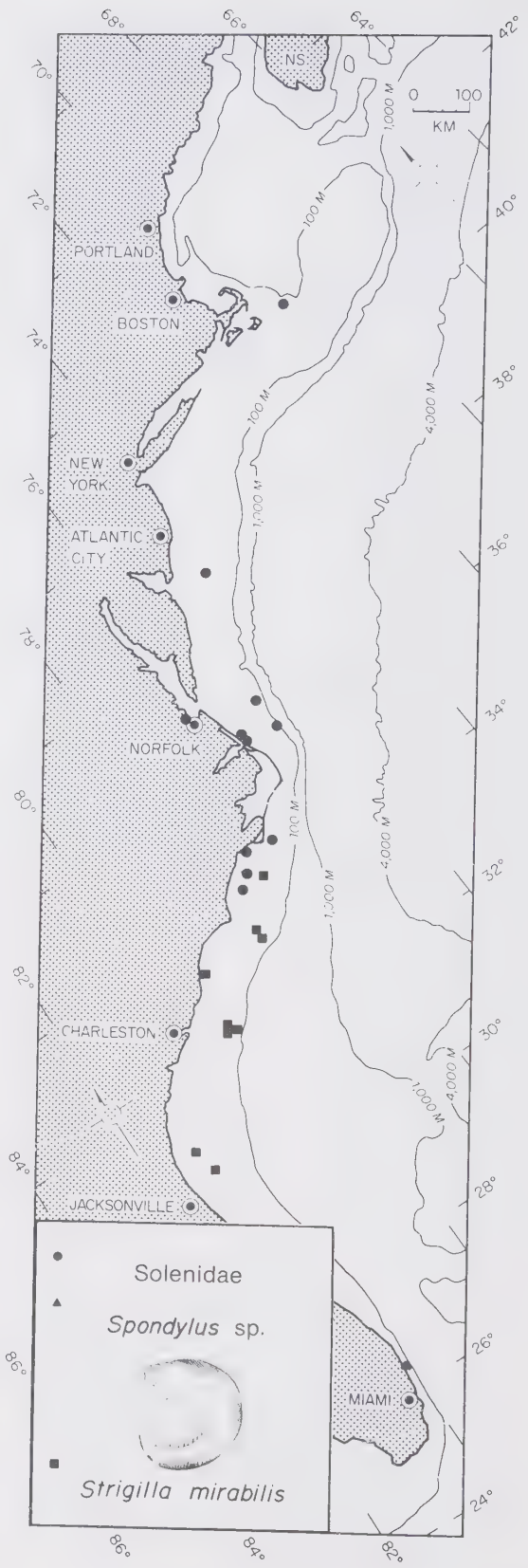

Figure 102.—Geographic distribution of Solenidae, *Spondylus* sp., and *Strigilla mirabilis*.

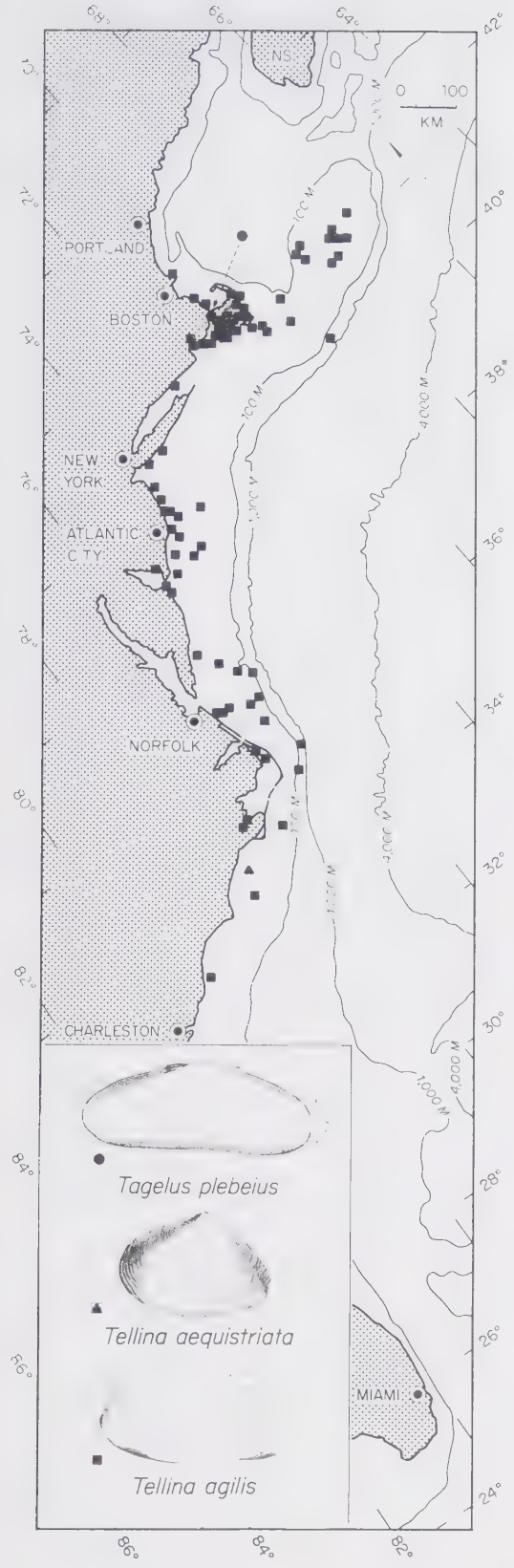

Figure 103.—Geographic distribution of *Tagelus plebeius*, *Tellina aequistriata*, and *Tellina agilis*.

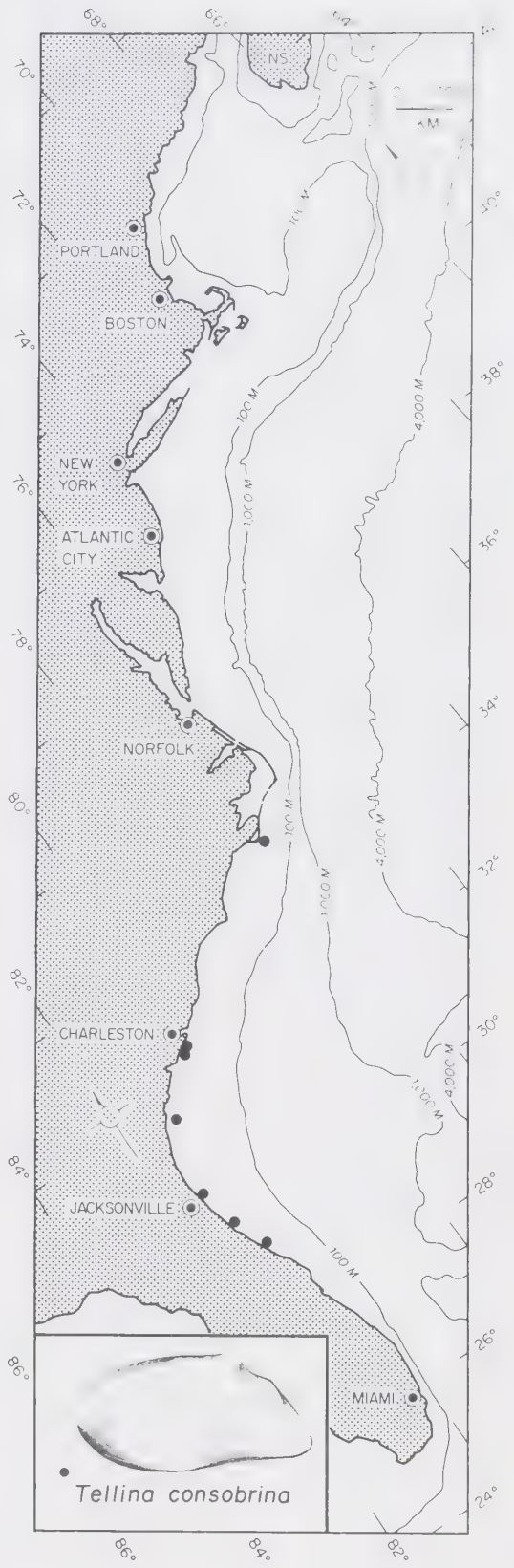

Figure 104.—Geographic distribution of *Tellina consobrina*.

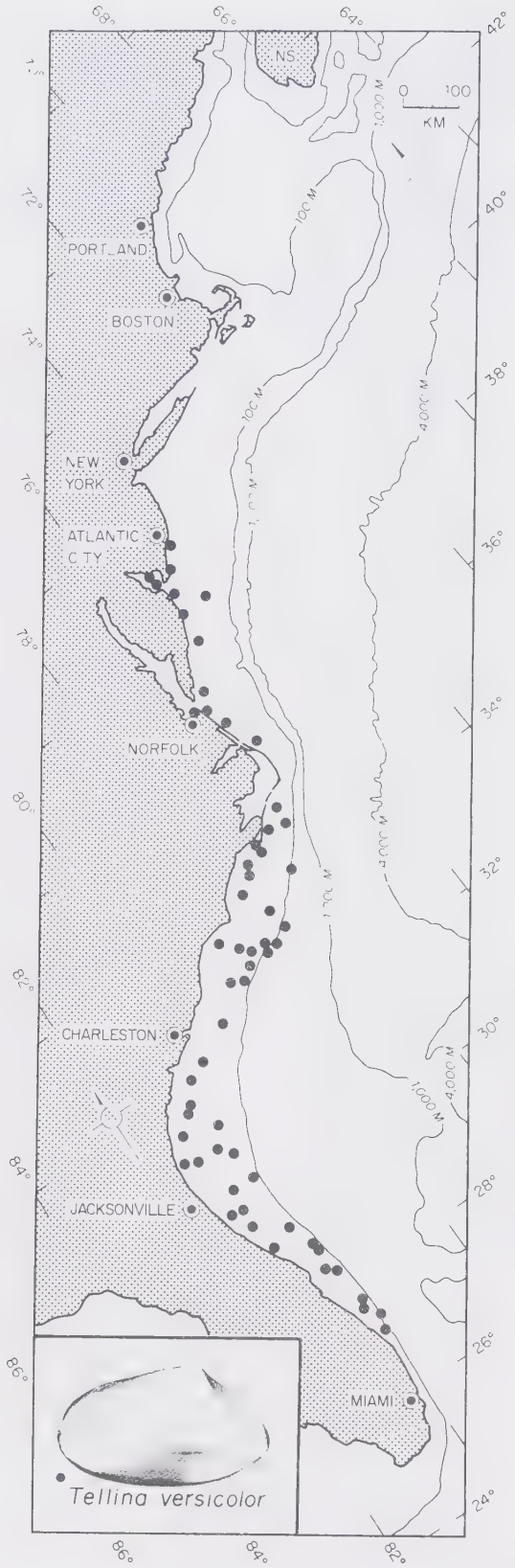

Figure 105.—Geographic distribution of *Tellina versicolor*.

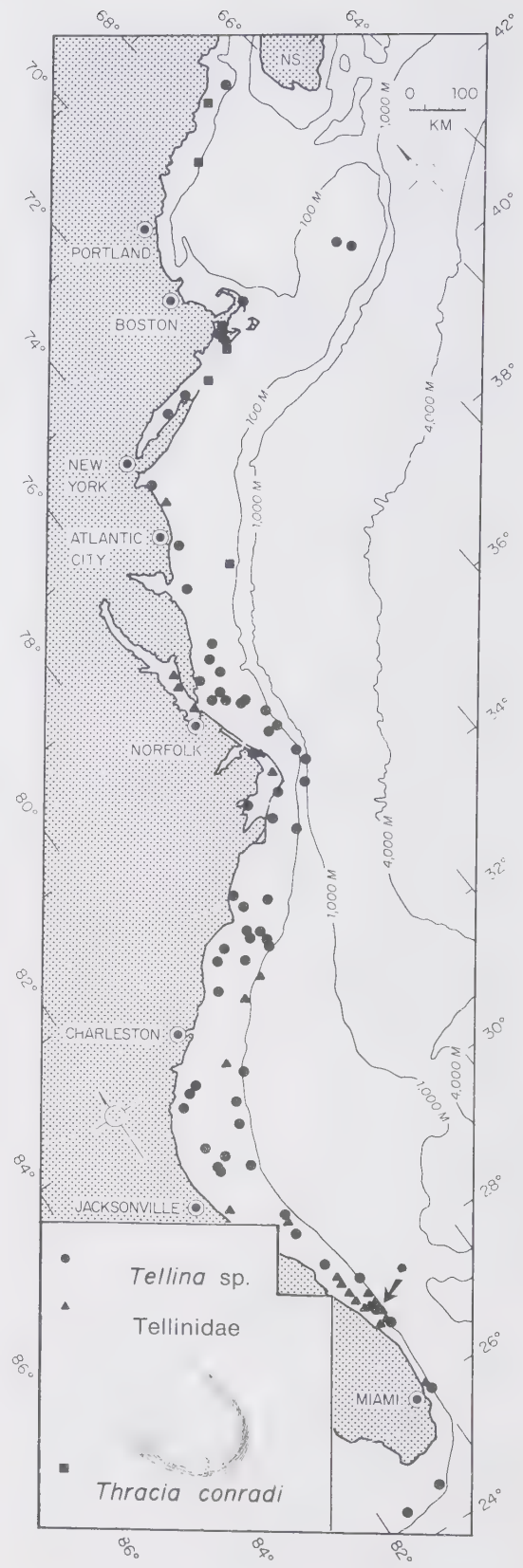

Figure 106.—Geographic distribution of *Tellina* sp., Tellinidae, and *Thracia conradi*.

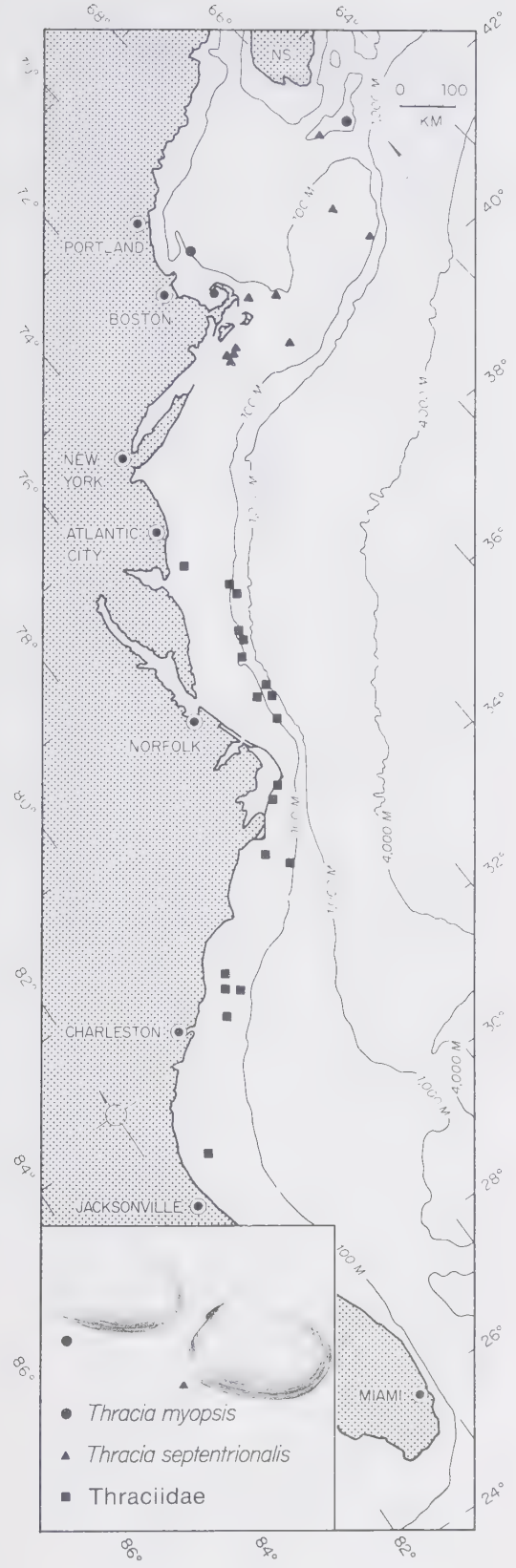

Figure 107.—Geographic distribution of *Thracia myopsis*, *Thracia septentrionalis*, and Thraciidae.

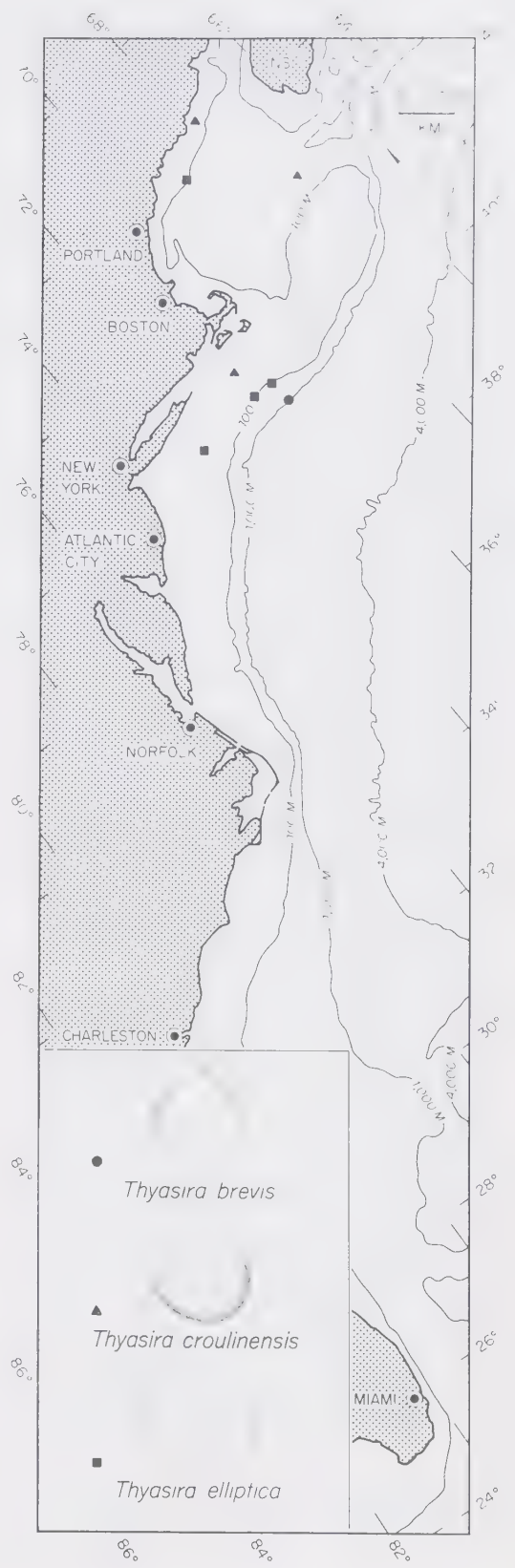

Figure 108.—Geographic distribution of *Thyasira brevis*, *Thyasira croulinensis*, and *Thyasira elliptica*.

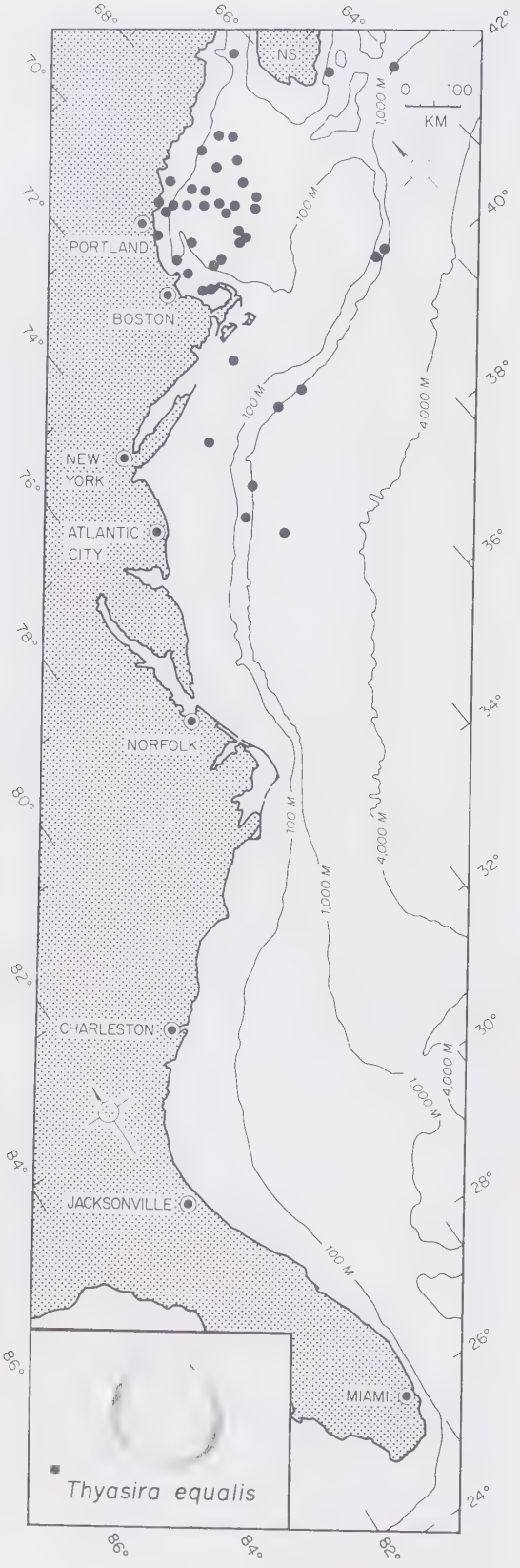

Figure 109.—Geographic distribution of *Thyasira equalis*.

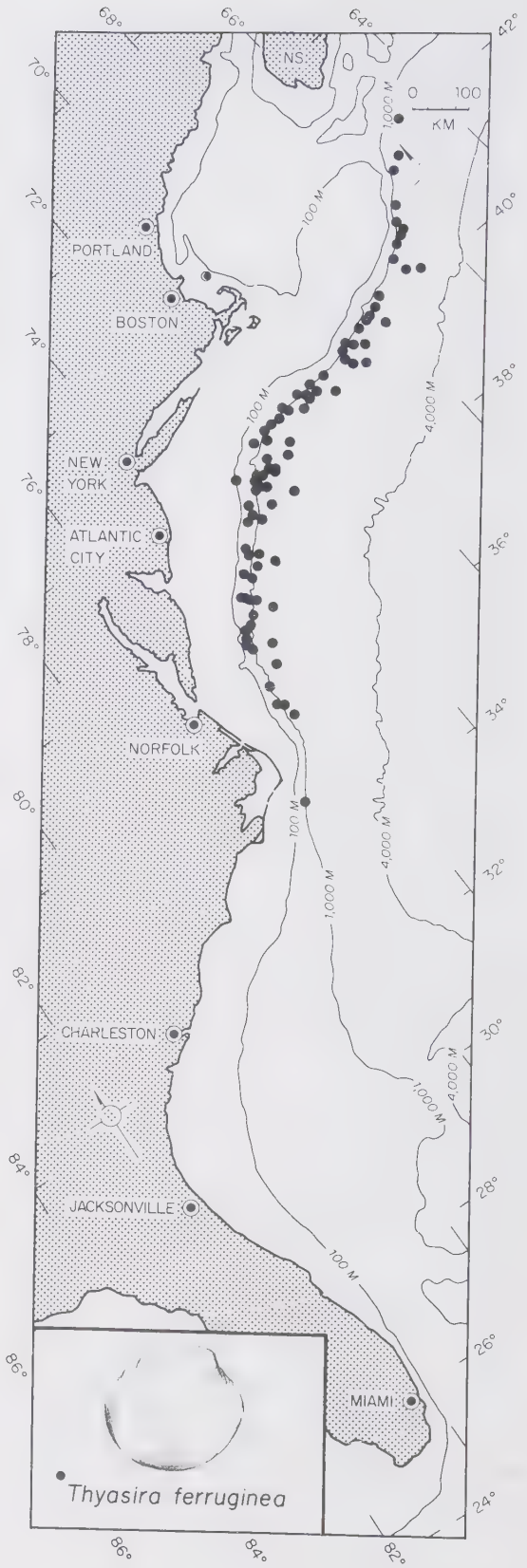

Figure 110.—Geographic distribution of *Thyasira ferruginea*.

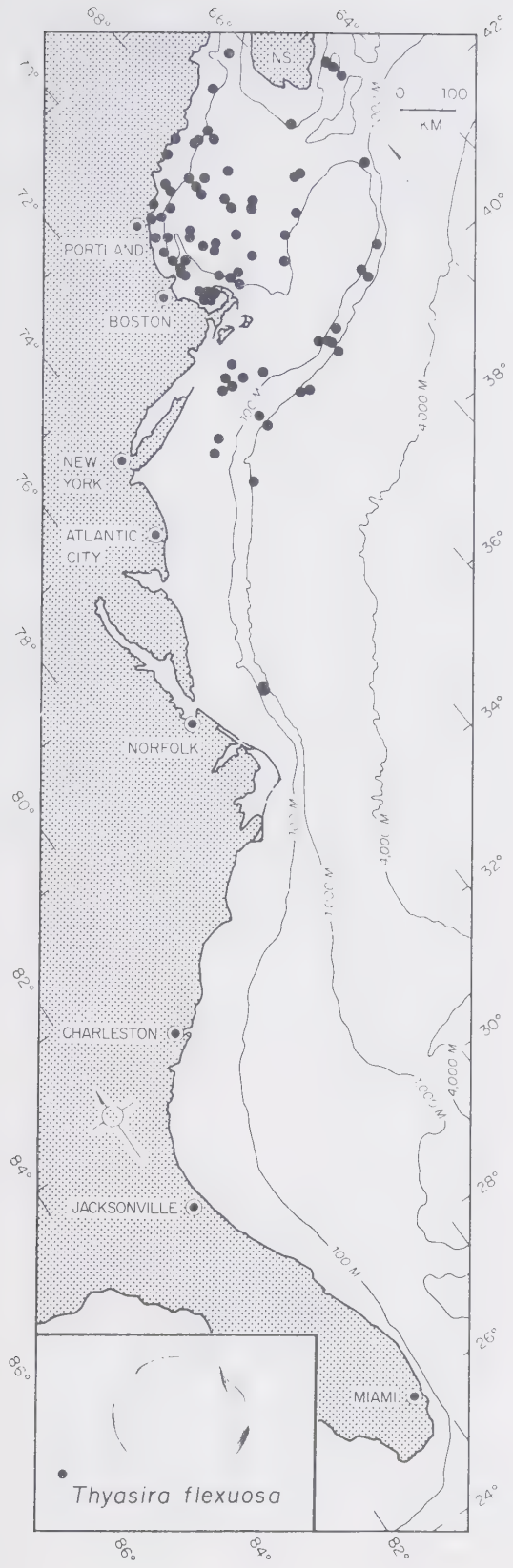

Figure 111.—Geographic distribution of *Thyasira flexuosa*.

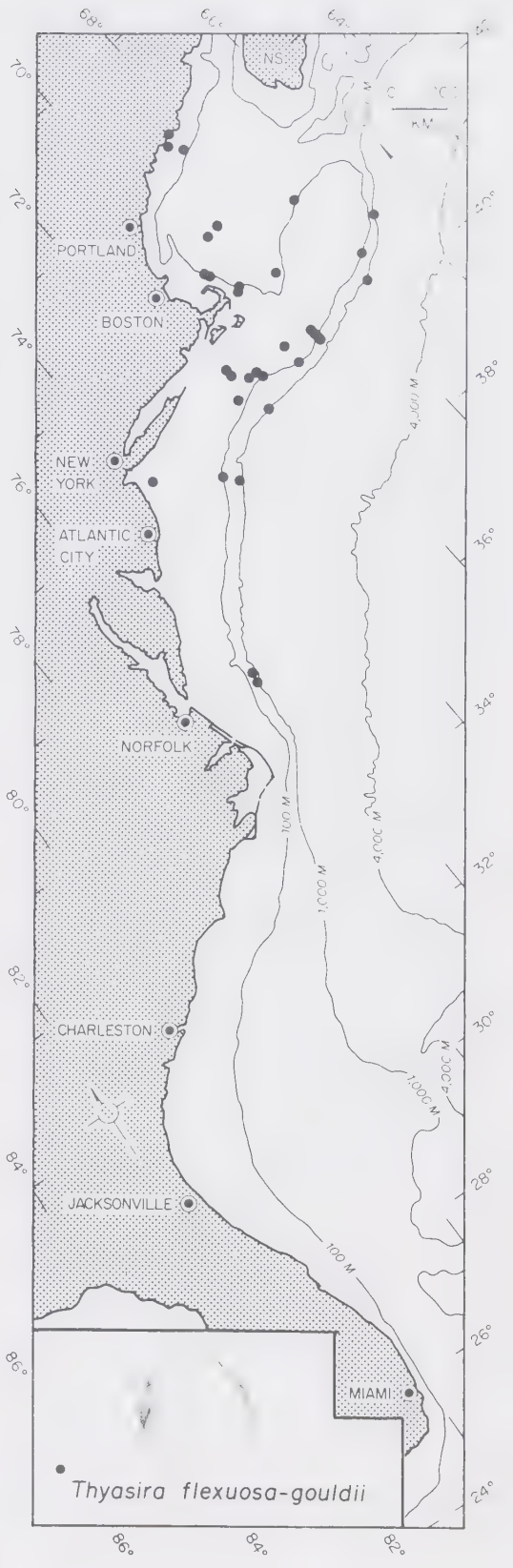

Figure 112.—Geographic distribution of *Thyasira flexuosa-gouldii*.

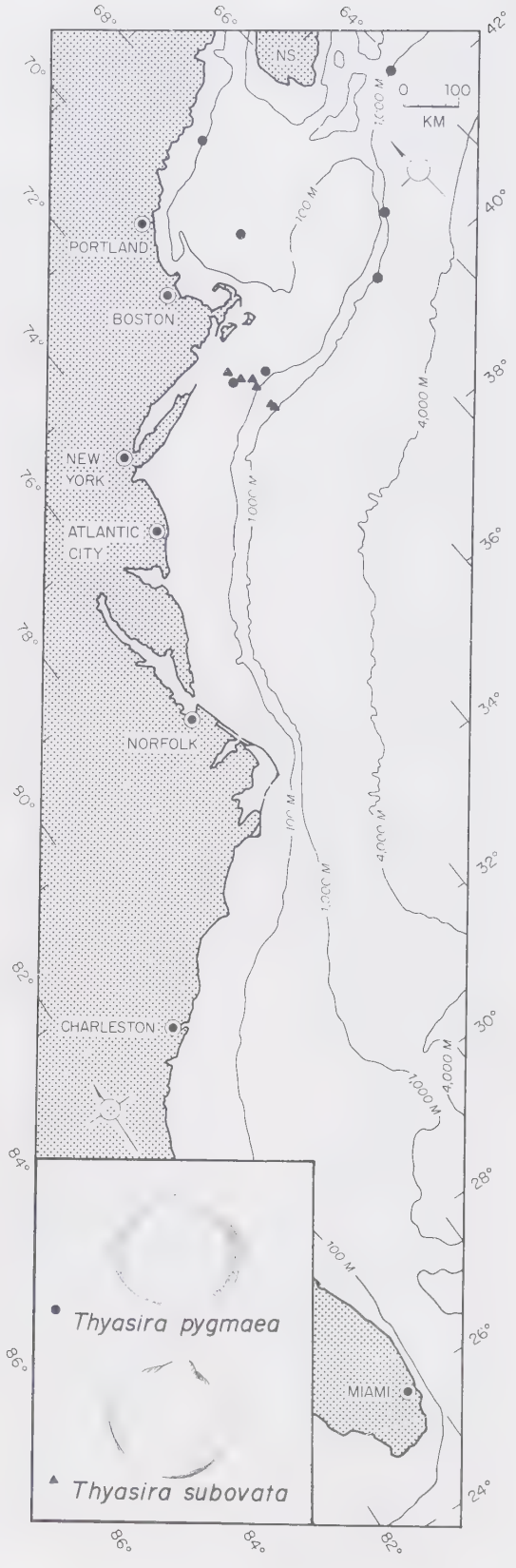

Figure 113.—Geographic distribution of *Thyasira pygmaea* and *Thyasira subovata*.

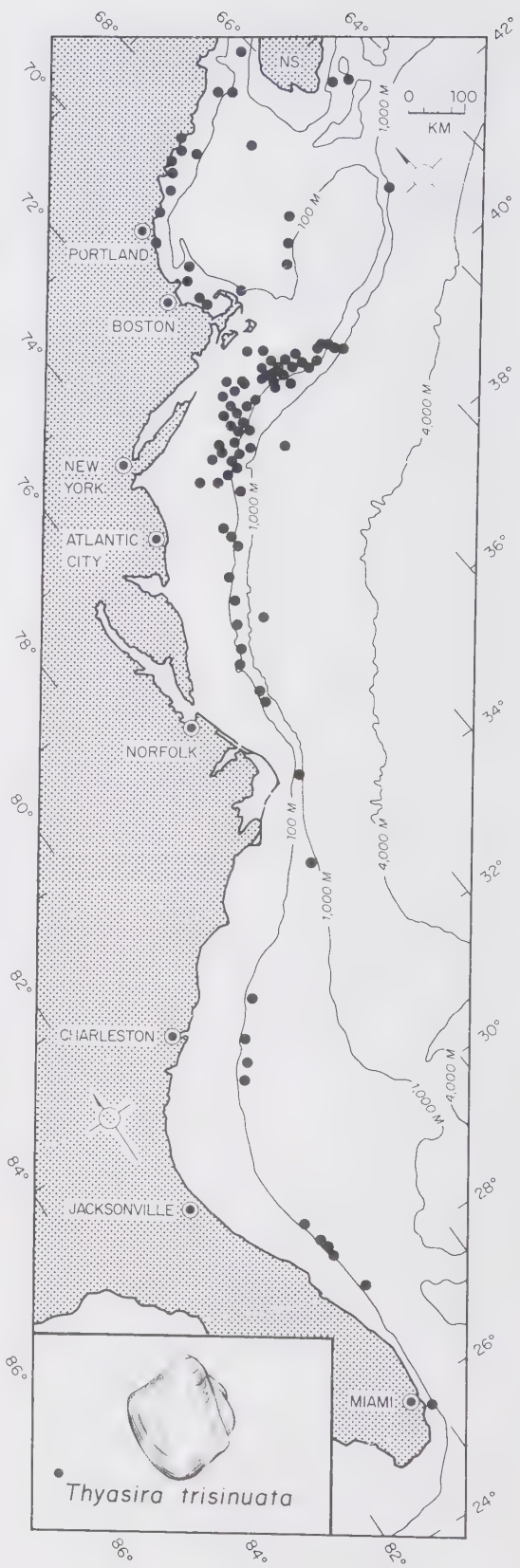

Figure 114.—Geographic distribution of *Thyasira trisinuata*.

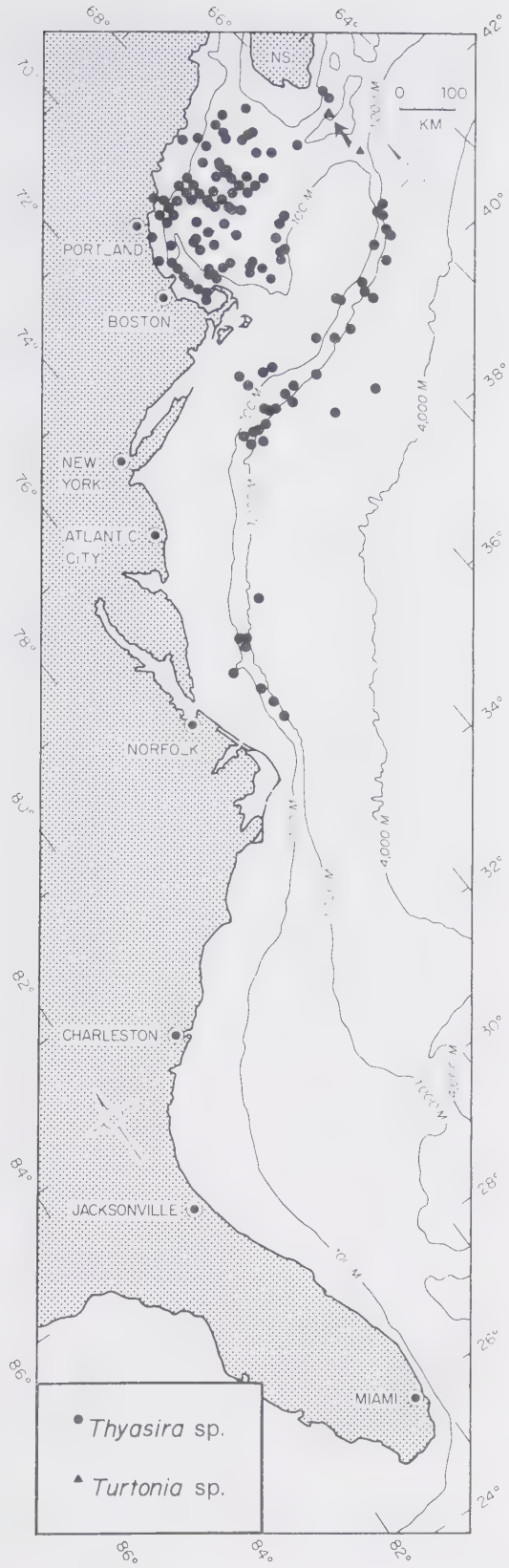

Figure 115.—Geographic distribution of *Thyasira* sp. and *Turtonia* sp.

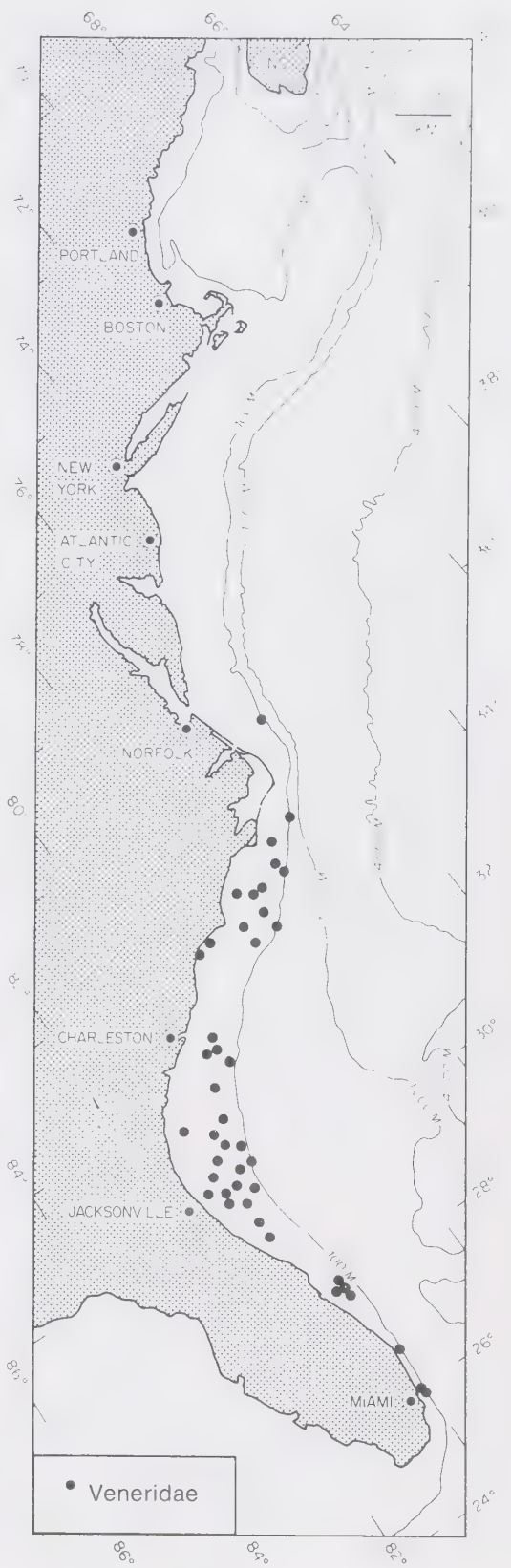

Figure 116.—Geographic distribution of Veneridae.

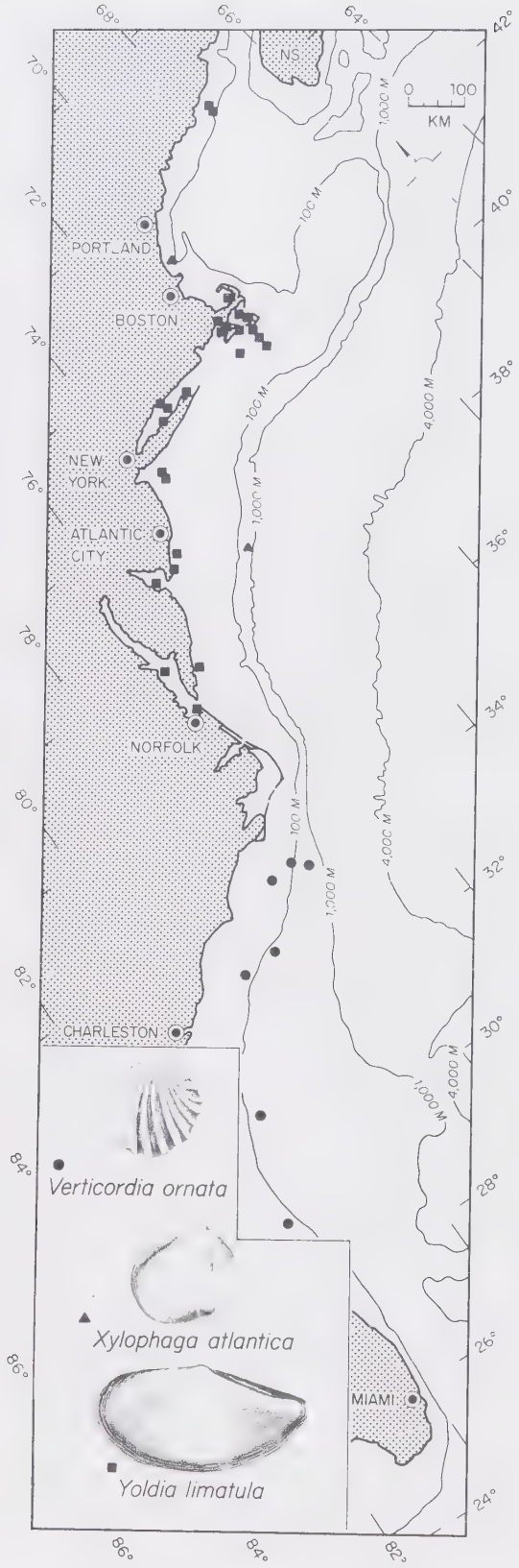

Figure 117.—Geographic distribution of *Verticordia ornata, Xylophaga atlantica.* and *Yoldia limatula.*

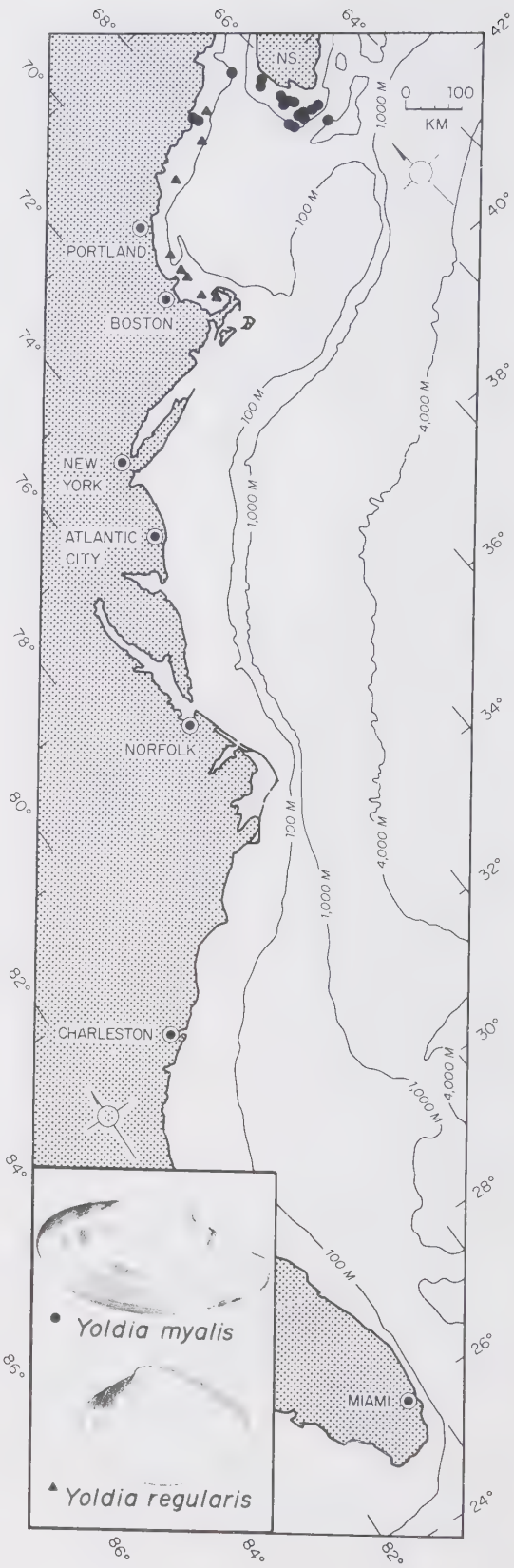

Figure 118.—Geographic distribution of *Yoldia myalis* and *Yoldia regularis.*

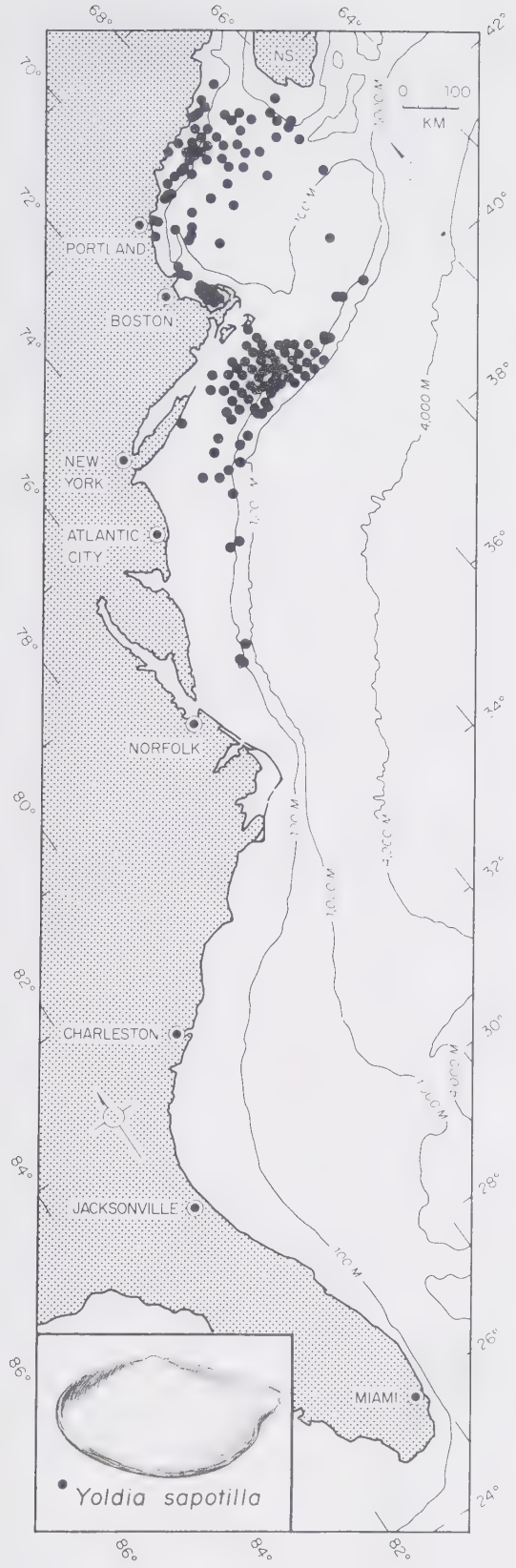

Figure 119.—Geographic distribution of *Yoldia sapotilla*.

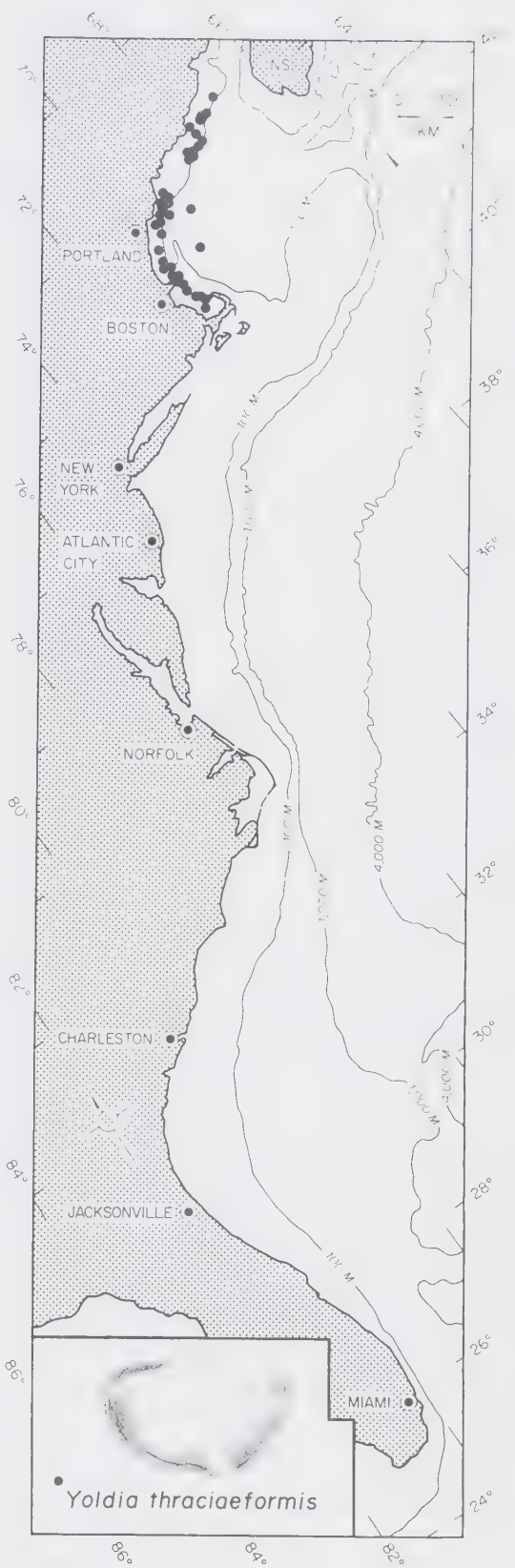

Figure 120.—Geographic distribution of *Yoldia thraciaeformis*.

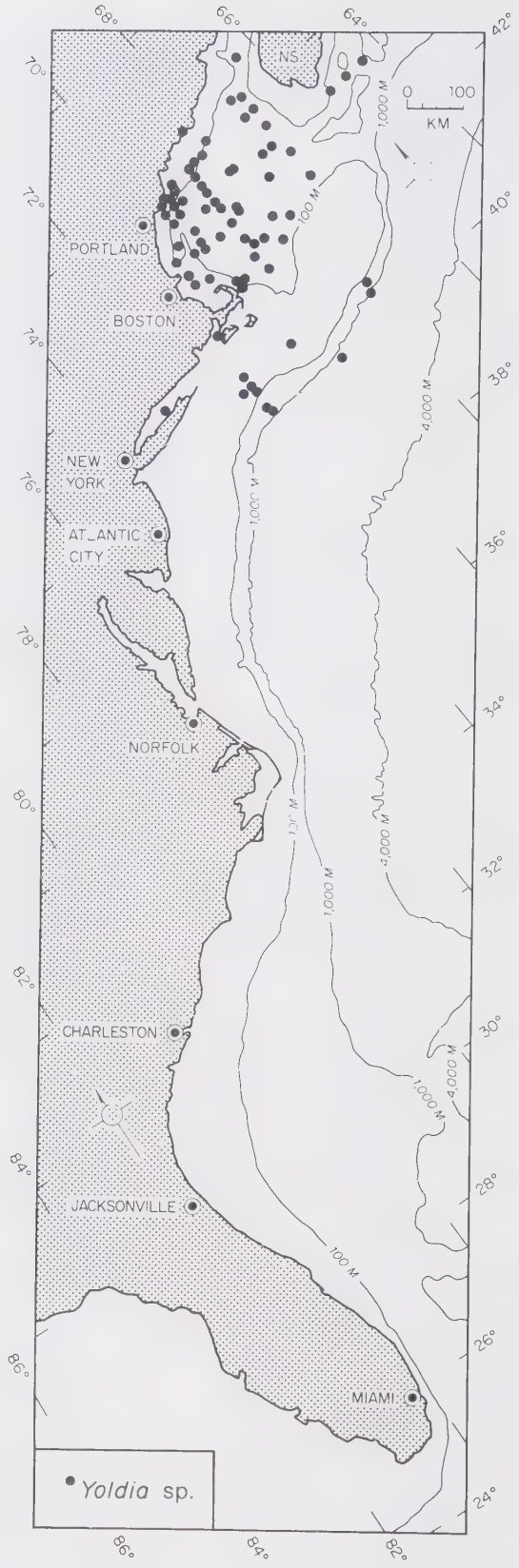

Figure 121.—Geographic distribution of *Yoldia* sp.

Table 1.--The distribution of samples containing bivalve mollusks in the NEFC Specimen Reference Collection by collecting vessel.

Vessel	Samples	
	Number	Percent
A. E. Verrill	6	0.1
Albatross III	984	9.4
Albatross IV	2,735	26.2
Asterias	571	5.5
Blueback	25	0.2
Delaware I & II	1,998	19.1
Fish Hawk	1	<0.1
Gilbert	4	<0.1
Gosnold	3,820	36.6
Harengus	1	<0.1
Priscilla V	3	<0.1
Shirley and Roland	3	<0.1
Silver Mink	18	0.2
Whaling City	1	<0.1
Samples with no designated vessel	295	2.7

Table 2.--The distribution of samples containing bivalve mollusks in the NEFC Specimen Reference Collection by type of sampling gear.

Sampling Gear	Samples	
	No.	%
Bottom Grabs		
Campbell	3,716	35.7
Dietz-LaFond	3	<0.1
Petersen	5	<0.1
Smith-McIntyre	2,099	20.1
Van Veen	90	0.9
WHOI Miniature Van Veen	2	<0.1
Dredges		
Digby drag	323	3.1
Digby scoop	29	0.3
Hydraulic Clam Dredge	37	0.3
MBL Naturalist Dredge	6	0.1
Quahog Dredge	19	0.2
Scallop Dredge	296	2.8
Rock Dredge	19	0.2
WHOI Chain Bag Dredge	19	0.2
WHOI Pipe Dredge	4	<0.1
1-Meter Naturalist Dredge	2,351	22.6
Trawls		
Beam Trawl	1	<0.1
Dutch Herring Trawl	1	<0.1
Isaacs-Kidd Trawl	2	<0.1
Otter Trawl	2	<0.1
6-Foot Seine	33	0.3
Miscellaneous		
Bottom Skimmer	196	1.0
Dip Net	71	0.7
Diver (Scuba)	4	<0.1
Fish Stomachs	97	0.9
Ring Net	181	1.7
1-Meter Sled	83	0.8
Other	92	0.9
Samples with no gear designation	40	0.4

Table 3.--Bathymetric occurrence of Bivalvia, based on 10,465 samples and 108,934 specimens.

Depth Range	Samples	Specimens
m	%	%
0-24	13.7	17.4
24-49	15.8	15.5
50-99	33.6	40.5
100-199	22.1	16.3
200-499	10.4	7.0
500-999	1.7	1.6
1000-1999	1.6	1.0
2000-3999	0.8	0.4
Unknown	0.3	0.3
Total	100.0	100.0

Table 4.--Occurrence of Bivalvia in bottom sediments, based on 10,465 samples and 108,934 specimens.

Bottom Type	Samples	Specimens
	%	%
Gravel	5.5	6.7
Sand-gravel	0.4	0.3
Till	6.0	9.9
Shell	1.4	0.9
Sand-shell	6.0	3.2
Sand	32.0	24.8
Silty sand	12.8	13.8
Silt	8.0	7.8
Clay	6.5	5.3
Unclassified	21.4	27.3
Total	100.0	100.0

Table 5.--Total and percent number of specimens and samples of each bivalve taxon in the NMFS collection.

	Samples		Specimens	
	No.	%	No.	%
Abra sp.	60	0.57	125	0.12
Aequipecten phrygium	1	0.01	10	0.01
Aligena elevata	2	0.02	3	<0.01
Anadara ovalis	3	0.03	3	<0.01
Anadara transversa	6	0.06	17	0.02
Anomia simplex	301	2.88	10,880	9.99
Anomia squamula	279	2.67	4,231	3.88
Arca sp.	11	0.11	19	0.02
Arcidae unident.	7	0.07	15	0.01
Arcinella cornuta	3	0.03	3	<0.01
Arctica islandica	378	3.60	2,081	1.91
Argopecten gibbus	2	0.02	7	0.01
Argopecten irradians	5	0.05	17	0.02
Astarte borealis	18	0.17	22	0.02
Astarte castanea	106	1.02	458	0.42
Astarte crenata subequilatera	433	4.14	4,972	4.56
Astarte elliptica	42	0.40	317	0.29
Astarte montagui	1	0.01	2	<0.01
Astarte nana	4	0.04	18	0.02
Astarte quadrans	28	0.27	48	0.04
Astarte smithii	2	0.02	3	<0.01
Astarte undata	444	4.25	4,705	4.32
Astarte sp.	94	0.90	533	0.49
Axinopsida orbiculata	1	0.01	1	<0.01
Barnea truncata	4	0.04	83	0.08
Barnea sp.	2	0.02	2	<0.01
Bathyarca anomala	9	0.09	129	0.12
Bathyarca pectunculoides	157	1.50	1,297	1.19
Bathyarca sp.	9	0.09	14	0.01
Bivalvia unident.	36	0.34	76	0.07
Brachidontes exustus	2	0.02	12	0.01
Callista eucymata	12	0.12	14	0.01
Cardiidae unident.	6	0.06	15	0.01
Cardiomya perrostrata	13	0.12	24	0.02
Cerastoderma pinnulatum	467	4.46	3,322	3.05
Chama sp.	1	0.01	1	<0.01
Chione intapurpurea	8	0.08	9	0.01
Chione latilirata	17	0.16	24	0.02
Chione sp.	36	0.35	58	0.05
Chlamys islandica	76	0.73	361	0.33
Clinocardium ciliatum	4	0.04	6	0.01
Corbula contracta	22	0.21	46	0.04
Corbula krebsiana	41	0.39	97	0.09
Corbula sp.	1	0.01	2	<0.01
Corbulidae unident.	56	0.54	150	0.14
Crassinella lunulata	87	0.83	226	0.21
Crassinella sp.	3	0.03	9	0.01
Crassostrea virginica	1	0.01	1	<0.01
Crenella decussata	83	0.79	443	0.41
Crenella glandula	229	2.19	1,835	1.68
Crenella sp.	35	0.33	69	0.06
Cumingea tellinoides	2	0.02	2	<0.01
Cuspidaria glacialis	49	0.47	184	0.17
Cuspidaria obesa	14	0.13	30	0.03
Cuspidaria parva	2	0.02	3	<0.01
Cuspidaria pellucida	4	0.04	19	0.02
Cuspidaria rostrata	2	0.02	9	0.01
Cuspidaria sp.	69	0.65	114	0.10
Cuspidariidae unident.	9	0.09	11	0.01
Cylocardia borealis	475	4.54	8,842	8.12
Cyclocardia novangliae	26	0.23	89	0.08
Cyclocardia sp.	16	0.15	22	0.02
Cyclopecten nanus	3	0.03	21	0.02
Cyclopecten pustulosus	30	0.29	58	0.05
Cyrtodaria siliqua	1	0.01	2	<0.01
Dacrydium vitreum	95	0.91	522	0.48
Delectopecten vitreus	3	0.03	12	0.01
Diplodonta sp.	58	0.56	90	0.08
Donax sp.	1	0.01	2	<0.01
Ensis directus	206	1.97	2,150	1.97
Ervilia concentrica	112	1.07	592	0.54
Eucrassatella speciosa	2	0.02	3	<0.01
Gemma gemma	33	0.32	2,211	2.03
Geukensia demissa	11	0.11	38	0.04
Glycymeris americana	1	0.01	1	<0.01
Glycymeris pectinata	20	0.19	40	0.04
Glycymeris sp.	23	0.22	48	0.04
Hiatella arctica	149	1.43	3,474	3.19
Hiatella striata	2	0.02	8	0.01
Hiatellidae unident.	7	0.07	17	0.02
Laevicardium mortoni	47	0.45	104	0.10
Limatula subauriculata	14	0.13	328	0.30
Limatula sp.	14	0.13	22	0.02
Limopsidae unident.	16	0.15	1,052	0.97
Limopsis affinis	4	0.04	10	0.01
Limopsis cristata	3	0.03	4	<0.01
Limopsis minuta	13	0.12	30	0.03
Limopsis sulcata	6	0.06	21	0.02
Limopsis sp.	2	0.02	2	<0.01
Liocyma fluctuosa	1	0.01	22	0.02
Lucinoma blakeana	6	0.06	34	0.03
Lucinoma filosa	241	2.31	2,266	2.08
Lucinoma sp.	4	0.04	4	<0.01

Table 5.--Cont'd.

	Samples		Specimens	
	No.	%	No.	%
Lucinidae unident.	44	0.42	166	0.15
Lyonsia arenosa	20	0.19	81	0.07
Lyonsia hyalina	129	1.24	544	0.50
Lyonsia sp.	5	0.05	6	0.01
Lyonsiella abyssicola	1	0.01	1	<0.01
Lyonsiella sp.	1	0.01	1	<0.01
Macoma balthica	45	0.43	783	0.72
Macoma calcarea	75	0.72	542	0.50
Macoma tenta	22	0.21	708	0.65
Macoma sp.	10	0.10	12	0.01
Malletia obtusa	38	0.36	145	0.14
Mercenaria mercenaria	9	0.09	21	0.02
Mesodesma arctatum	2	0.02	52	0.05
Modiolus modiolus	127	1.22	1,132	1.04
Montacuta sp.	1	0.01	1	<0.01
Mulinia lateralis	51	0.50	897	0.82
Mulinia sp.	1	0.01	2	<0.01
Musculus corrugatus	11	0.11	88	0.08
Musculus discors	80	0.77	457	0.42
Musculus niger	115	1.10	406	0.37
Musculus sp.	13	0.12	75	0.07
Mya arenaria	64	0.61	290	0.27
Myrtea pristiphora	4	0.04	8	0.01
Mysella sp.	1	0.01	2	<0.01
Mytilidae unident.	33	0.32	201	0.19
Mytilus edulis	107	1.02	5,272	4.84
Nemocardium peramabile	1	0.01	2	<0.01
Noetia ponderosa	1	0.01	5	0.01
Nucula delphinodonta	145	1.39	2,092	1.92
Nucula proxima	223	2.13	12,091	11.10
Nucula tenuis	215	2.06	2,031	1.86
Nucula sp.	108	1.03	961	0.88
Nuculana acuta	59	0.56	352	0.32
Nuculana carpenteri	17	0.16	45	0.04
Nuculana caudata	1	0.01	2	<0.01
Nuculana pernula	119	1.14	320	0.29
Nuculana tenuisulcata	129	1.23	469	0.43
Nuculana sp.	84	0.80	448	0.41
Nuculanidae unident.	98	0.94	834	0.77
Nuculoida	2	0.02	2	<0.01
Ostrea sp.	1	0.01	1	<0.01
Pandora bushiana	8	0.08	15	0.01
Pandora gouldiana	33	0.32	144	0.13
Pandora inflata	17	0.16	34	0.03
Pandora inornata	21	0.20	159	0.15
Pandora trilineata	9	0.09	11	0.01
Pandora sp.	8	0.08	11	0.01
Panomya arctica	19	0.18	64	0.06
Papyridea semisulcata	2	0.02	3	<0.01
Parvilucina blanda	5	0.05	6	0.01
Pectinidae unident.	14	0.13	23	0.02
Periglypta lister	2	0.02	6	0.01
Periploma affine	2	0.02	21	0.02
Periploma fragile	27	0.26	101	0.09
Periploma leanum	27	0.26	60	0.06
Periploma papyratium	265	2.54	2,976	2.73
Periploma sp.	4	0.04	4	<0.01
Petricola pholadiformis	7	0.07	27	0.03
Pitar morrhuanus	102	0.98	723	0.66
Pitar sp.	60	0.57	130	0.12
Placopecten magellanicus	164	1.57	1,225	1.13
Plectodon sp.	4	0.04	6	0.01
Pleuromeris tridentata	61	0.58	168	0.15
Plicatula gibbosa	4	0.04	6	0.01
Poromya sp.	6	0.06	6	0.01
Portlandia fraterna	3	0.03	5	0.01
Portlandia frigida	3	0.03	5	0.01
Portlandia inconspicua	1	0.01	3	<0.01
Portlandia inflata	24	0.23	197	0.18
Portlandia iris	47	0.45	334	0.31
Portlandia lenticula	4	0.04	4	<0.01
Portlandia lucida	27	0.26	161	0.15
Portlandia minuscula	1	0.01	2	<0.01
Propeamussium thalassinum	6	0.06	28	0.03
Pteromeris perplana	14	0.13	28	0.03
Rangia cuneata	4	0.04	9	0.01
Saturnia subovata	22	0.21	70	0.06
Semele bellastriata	19	0.18	38	0.04
Semele nuculoides	62	0.59	146	0.13
Semele purpurascens	4	0.04	6	0.01
Semele sp.	2	0.02	3	<0.01
Siliqua costata	32	0.31	104	0.10
Solemya borealis	1	0.01	1	<0.01
Solemya velum	33	0.32	67	0.06
Spisula polynyma	2	0.02	14	0.01
Spisula solidissima	166	1.59	764	0.70
Solenidae unident.	11	0.11	39	0.04
Spondylus sp.	1	0.01	2	<0.01
Strigilla mirabilis	9	0.09	12	0.01
Tagelus plebeius	1	0.01	4	<0.01
Tellina aequistriata	1	0.01	1	<0.01
Tellina agilis	114	1.09	1,131	1.04
Tellina consobrina	7	0.07	20	0.02
Tellina versicolor	58	0.55	297	0.27
Tellina sp.	70	0.67	151	0.14
Tellinidae unident.	26	0.25	67	0.06

Table 5.--Cont'd.

	Samples		Specimens	
	No.	%	No.	
Thracia conradi	6	0.06	10	0.01
Thracia myopsis	3	0.03	6	0.01
Thracia septentrionalis	13	0.12	46	0.04
Thraciidae unident.	19	0.18	36	0.03
Thyasira brevis	1	0.01	3	<0.01
Thyasira croulinensis	3	0.03	4	<0.01
Thyasira elliptica	4	0.04	12	0.01
Thyasira equalis	44	0.42	309	0.28
Thyasira ferruginea	92	0.88	1,381	1.27
Thyasira flexuosa	104	1.00	1,044	0.96
Thyasira flexuosa-gouldi	37	0.35	415	0.38
Thyasira pygmaea	8	0.08	64	0.06
Thyasira subovata	7	0.07	18	0.02
Thyasira trisinuata	133	1.27	1,079	0.99
Thyasira sp.	142	1.36	734	0.67
Turtonia sp.	1	0.01	1	<0.01
Veneridae unident.	54	0.52	117	0.11
Verticordia ornata	7	0.07	8	0.01
Xylophaaga atlantica	3	0.03	76	0.07
Yoldia limatula	37	0.35	375	0.34
Yoldia myalis	21	0.20	47	0.04
Yoldia regularis	11	0.11	42	0.04
Yoldia sapotilla	279	2.67	2,128	1.95
Yoldia thraciaeformia	46	0.44	158	0.15
Yoldia sp.	88	0.84	303	0.28
Total	10,465		108,934	

Table 6. --Bathymetric occurrence of Unidentified Bivalvia, based on 36 samples and 76 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	19.4	15.8
25-49	5.6	2.6
50-99	41.6	55.3
100-199	16.7	14.5
200-499	16.7	11.8
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 7.--Occurrence of Unidentified Bivalvia in bottom sediments, based on 29 samples and 60 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.4	1.7
Sand-gravel	13.8	8.3
Till	3.4	26.7
Shell	3.4	1.7
Sand-shell	3.4	1.7
Sand	44.8	45.0
Silty sand	10.3	6.7
Silt	6.9	3.3
Clay	10.3	4.9
Total	100.0	100.0

Table 8. --Bathymetric occurrence of Nucula delphinodonta, based on 145 samples and 2,092 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	5.5	1.8
25-49	13.8	10.6
50-99	40.7	78.2
100-199	17.9	4.3
200-499	13.8	1.6
500-999	4.8	1.3
1000-1999	3.5	2.2
2000-3999	--	--
Total	100.0	100.0

Table 9. --Occurrence of Nucula delphinodonta in bottom sediments, based on 143 samples and 2,086 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.8	0.7
Sand-gravel	4.2	0.4
Till	4.2	0.8
Shell	2.1	0.5
Sand-shell	0.7	0.2
Sand	23.8	15.6
Silty sand	29.3	72.2
Silt	13.3	3.3
Clay	19.6	6.3
Total	100.0	100.0

Table 10. --Bathymetric occurrence of Nucula proxima, based on 221 samples and 12,073 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	30.8	46.9
25-49	26.7	6.9
50-99	36.6	45.4
100-199	5.0	0.8
200-499	0.9	<0.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 11. --Occurrence of Nucula proxima in bottom sediments, based on 214 samples and 12,059 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	0.9	<0.1
Sand-gravel	2.3	0.2
Till	0.5	0.1
Shell	1.4	0.2
Sand-shell	9.9	0.4
Sand	48.1	40.4
Silty sand	17.3	32.9
Silt	4.2	3.7
Clay	15.4	22.1
Total	100.0	100.0

Table 12. --Bathymetric occurrence of Nucula tenuis, based on 215 samples and 2,031 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.5	<0.1
25-49	8.4	4.0
50-99	23.7	54.6
100-199	41.4	23.8
200-499	7.9	2.7
500-999	7.9	4.5
1000-1999	9.3	10.0
2000-3999	0.9	0.4
Total	100.0	100.0

Table 13. --Occurrence of Nucula tenuis in bottom sediments, based on 200 samples and 1,956 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.0	0.5
Sand-gravel	5.5	4.2
Till	3.0	0.8
Shell	1.0	0.9
Sand-shell	0.5	0.1
Sand	17.5	7.8
Silty sand	35.5	36.2
Silt	16.0	20.4
Clay	18.0	29.1
Total	100.0	100.0

Table 14. --Bathymetric occurrence of Nucula sp., based on 108 samples and 961 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.8	14.5
25-49	10.2	2.3
50-99	7.4	2.1
100-199	12.1	19.8
200-499	15.7	2.7
500-999	12.0	11.1
1000-1999	27.8	37.6
2000-3999	12.0	9.9
Total	100.0	100.0

Table 15. --Occurrence of Nucula sp. in bottom sediments, based on 104 samples and 761 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.0	0.3
Sand-gravel	1.9	18.5
Till	1.0	1.6
Shell	--	--
Sand-shell	5.8	2.4
Sand	17.3	4.5
Silty sand	29.8	29.8
Silt	31.7	37.2
Clay	11.5	5.7
Total	100.0	100.0

Table 16. --Bathymetric occurrence of Malletia obtusa, based on 38 samples and 145 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	52.6	66.2
2000-3999	47.4	33.8
Total	100.0	100.0

Table 17. --Occurrence of Malletia obtusa in bottom sediments, based on 38 samples and 145 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	21.1	17.2
Silt	52.6	62.1
Clay	26.3	20.7
Total	100.0	100.0

Table 18. --Bathymetric occurrence of Saturnia subovata, based on 22 samples and 70 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	--	--
500-999	4.5	4.3
1000-1999	45.5	57.1
2000-3999	50.0	38.6
Total	100.0	100.0

Table 19. --Occurrence of Saturnia subovata in bottom sediments, based on 22 samples and 70 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	22.7	22.8
Silt	63.7	58.6
Clay	13.6	18.6
Total	100.0	100.0

Table 20. --Bathymetric occurrence of Nuculanidae, based on 98 samples and 834 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	3.1	0.5
50-99	4.1	1.0
100-199	10.2	17.6
200-499	56.1	73.0
500-999	24.5	7.5
1000-1999	--	--
2000-3999	2.0	0.4
Total	100.0	100.0

Table 21. --Occurrence of Nuculanidae in bottom sediments, based on 98 samples and 834 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.1	1.4
Sand-gravel	--	--
Till	--	--
Shell	2.0	1.8
Sand-shell	10.2	4.1
Sand	33.7	37.9
Silty sand	28.6	35.5
Silt	20.4	18.9
Clay	2.0	0.4
Total	100.0	100.0

Table 22. --Bathymetric occurrence of Nuculana acuta, based on 59 samples and 352 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	15.3	7.1
100-199	79.7	89.5
200-499	5.0	3.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 23. --Occurrence of Nuculana acuta in bottom sediments, based on 59 samples and 352 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	33.9	38.3
Silty sand	42.4	48.6
Silt	5.1	1.7
Clay	18.6	11.4
Total	100.0	100.0

Table 24. --Bathymetric occurrence of Nuculana carpenteri, based on 17 samples and 45 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	17.6	11.1
200-499	82.4	88.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 25. --Occurrence of Nuculana carpenteri in bottom sediments, based on 17 samples and 45 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	17.6	15.6
Silty sand	41.2	22.2
Silt	41.2	62.2
Clay	--	--
Total	100.0	100.0

Table 26. --Bathymetric occurrence of Nuculana pernula, based on 119 samples and 320 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	2.5	3.1
50-99	33.6	50.6
100-199	41.2	31.9
200-499	21.9	13.8
500-999	0.8	0.6
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 27. --Occurrence of Nuculana pernula in bottom sediments, based on 113 samples and 306 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	15.9	16.7
Sand-gravel	0.9	0.3
Till	23.9	20.6
Shell	1.8	2.0
Sand-shell	2.6	1.6
Sand	8.0	4.6
Silty sand	14.1	25.5
Silt	8.0	3.9
Clay	24.8	24.8
Total	100.0	100.0

Table 28. --Bathymetric occurrence of Nuculana tenuisulcata, based on 129 samples and 469 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	3.9	2.6
50-99	23.2	26.6
100-199	44.2	40.3
200-499	28.7	30.5
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 29. --Occurrence of Nuculana tenuisulcata in bottom sediments, based on 120 samples and 414 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.3	5.6
Sand-gravel	6.7	2.7
Till	20.9	33.3
Shell	--	--
Sand-shell	0.8	1.4
Sand	5.8	2.9
Silty sand	28.3	28.5
Silt	8.3	8.9
Clay	20.9	16.7
Total	100.0	100.0

Table 30. --Bathymetric occurrence of Nuculana sp., based on 84 samples and 448 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.4	0.7
25-49	11.9	3.8
50-99	21.4	60.9
100-199	41.7	27.9
200-499	22.6	6.7
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 31. --Occurrence of Nuculana sp. in bottom sediments, based on 82 samples and 446 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.4	2.5
Sand-gravel	--	--
Till	--	--
Shell	2.4	1.1
Sand-shell	17.1	27.6
Sand	24.4	42.8
Silty sand	39.1	21.5
Silt	1.2	0.2
Clay	13.4	4.3
Total	100.0	100.0

Table 32. --Bathymetric occurrence of Yoldia limatula, based on 37 samples and 375 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	59.5	64.3
25-49	29.7	28.5
50-99	5.4	6.7
100-199	5.4	0.5
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 33. --Occurrence of Yoldia limatula in bottom sediments, based on 30 samples and 342 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	70.1	40.1
Silty sand	23.3	21.6
Silt	3.3	38.0
Clay	3.3	0.3
Total	100.0	100.0

Table 34. --Bathymetric occurrence of Yoldia myalis, based on 21 samples and 47 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	4.8	6.4
25-49	9.5	4.3
50-99	80.9	87.2
100-199	4.8	2.1
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 35. --Occurrence of Yoldia myalis in bottom sediments, based on 18 samples and 44 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	33.3	25.0
Sand-gravel	27.7	31.8
Till	5.6	2.3
Shell	11.1	27.3
Sand-shell	11.1	4.5
Sand	--	--
Silty sand	5.6	2.3
Silt	5.6	6.8
Clay	--	--
Total	100.0	100.0

Table 36. --Bathymetric occurrence of Yoldia regularis, based on 11 samples and 42 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	9.1	2.4
50-99	81.8	76.2
100-199	9.1	21.4
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 37. --Occurrence of Yoldia regularis in bottom sediments, based on 11 samples and 42 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	54.5	21.4
Silt	36.4	57.2
Clay	9.1	21.4
Total	100.0	100.0

Table 38. --Bathymetric occurrence of Yoldia sapotilla, based on 278 samples and 1,980 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.7	0.1
25-49	9.7	8.2
50-99	54.7	66.4
100-199	21.2	17.0
200-499	13.7	8.3
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 39. --Occurrence of Yoldia sapotilla in bottom sediments, based on 270 samples and 1,970 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	0.4	<0.1
Till	5.2	2.7
Shell	0.4	<0.1
Sand-shell	0.7	0.2
Sand	27.8	25.2
Silty sand	33.3	37.9
Silt	5.9	6.6
Clay	26.3	27.4
Total	100.0	100.0

Table 40. --Bathymetric occurrence of Yoldia thraciaeformis, based on 46 samples and 158 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	4.3	1.3
50-99	65.3	73.4
100-199	26.1	23.4
200-499	4.3	1.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 41. --Occurrence of Yoldia thraciaeformia in bottom sediments, based on 41 samples and 144 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.4	2.1
Sand-gravel	--	--
Till	24.4	14.6
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	12.2	7.6
Silt	12.2	34.0
Clay	48.8	41.7
Total	100.0	100.0

Table 42. --Bathymetric occurrence of Yoldia sp., based on 88 samples and 303 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	1.1	0.7
25-49	4.5	1.7
50-99	14.8	20.1
100-199	43.3	51.4
200-499	35.2	24.8
500-999	--	--
1000-1999	1.1	1.3
2000-3999	--	--
Total	100.0	100.0

Table 43. --Occurrence of Yoldia sp. in bottom sediments, based on 83 samples and 272 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.2	0.4
Sand-gravel	2.4	4.8
Till	9.7	5.9
Shell	--	--
Sand-shell	--	--
Sand	9.7	6.9
Silty sand	31.3	31.2
Silt	12.0	10.7
Clay	33.7	40.1
Total	100.0	100.0

Table 44. --Bathymetric occurrence of Portlandia fraterna, based on three samples and five specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	66.7	60.0
200-499	33.3	40.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 45. --Occurrence of Portlandia fraterna in bottom sediments, based on three samples and five specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	-
Sand	--	--
Silty sand	66.7	60.0
Silt	--	--
Clay	33.3	40.0
Total	100.0	100.0

Table 46. --Bathymetric occurrence of Portlandia frigida, based on three samples and five specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	33.3	20.0
100-199	--	--
200-499	66.7	80.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 47. --Occurrence of Portlandia frigida in bottom sediments, based on three samples and five specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	33.3	60.0
Silt	--	--
Clay	66.7	40.0
Total	100.0	100.0

Table 48. --Bathymetric occurrence of Portlandia inflata, based on 24 samples and 197 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	20.8	6.1
100-199	4.2	1.5
200-499	75.0	92.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 49. --Occurrence of Portlandia inflata in bottom sediments, based on 24 samples and 197 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	16.6	65.0
Till	4.2	0.5
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	4.2	1.5
Silt	25.0	13.2
Clay	50.0	19.8
Total	100.0	100.0

Table 50. --Bathymetric occurrence of Portlandia iris, based on 47 samples and 334 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.1	0.3
25-49	--	--
50-99	14.9	12.6
100-199	27.7	26.0
200-499	55.3	61.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 51. --Occurrence of Portlandia iris in bottom sediments, based on 46 samples and 331 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	4.3	2.4
Sand-gravel	--	--
Till	15.2	4.5
Shell	--	--
Sand-shell	--	--
Sand	6.5	7.0
Silty sand	28.3	35.3
Silt	15.3	13.3
Clay	30.4	37.5
Total	100.0	100.0

Table 52. --Bathymetric occurrence of Portlandia lenticula, based on four samples and four specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	75.0	75.0
100-199	--	--
200-499	25.0	25.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 53. --Occurrence of Portlandia lenticula in bottom sediments, based on four samples and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	75.0	75.0
Silt	25.0	25.0
Clay	--	--
Total	100.0	100.0

Table 54. --Bathymetric occurrence of Portlandia lucida, based on 27 samples and 161 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.7	0.6
25-49	--	--
50-99	18.5	11.2
100-199	44.5	47.8
200-499	33.3	40.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 55. --Occurrence of Portlandia lucida in bottom sediments, based on 25 samples and 132 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	4.0	5.3
Sand-gravel	4.0	0.8
Till	16.0	44.7
Shell	--	--
Sand-shell	4.0	4.5
Sand	4.0	0.8
Silty sand	24.0	25.7
Silt	4.0	2.3
Clay	40.0	15.9
Total	100.0	100.0

Table 56.--Bathymetric occurrence of Solemya velum, based on 33 samples and 65 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	42.4	64.6
25-49	15.1	7.7
50-99	27.3	20.0
100-199	6.1	3.1
200-499	6.1	3.1
500-999	--	--
1000-1999	3.0	1.5
2000-3999	--	--
Total	100.0	100.0

Table 57. --Occurrence of Solemya velum in bottom sediments, based on 21 samples and 37 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	9.5	5.4
Sand	57.2	35.2
Silty sand	14.3	48.6
Silt	9.5	5.4
Clay	9.5	5.4
Total	100.0	100.0

Table 58.--Bathymetric occurrence of Arcidae, based on 7 samples and 15 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	42.8	53.3
25-49	--	--
50-99	14.3	13.3
100-199	14.3	6.7
200-499	14.3	6.7
500-999	--	--
1000-1999	--	--
2000-3999	14.3	20.0
Total	100.0	100.0

Table 59.--Occurrence of Arcidae in bottom sediments, based on 7 samples and 15 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	14.3	6.7
Sand-gravel	14.3	6.7
Till	14.3	6.7
Shell	--	--
Sand-shell	--	--
Sand	28.5	46.6
Silty sand	14.3	20.0
Silt	--	--
Clay	14.3	13.3
Total	100.0	100.0

Table 60. --Bathymetric occurrence of Arca sp., based on 11 samples and 19 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	27.3	26.3
25-49	36.3	36.8
50-99	9.1	5.3
100-199	--	--
200-499	9.1	10.5
500-999	18.2	21.1
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 61.--Occurrence of Arca sp. in bottom sediments, based on 11 samples and 19 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	27.3	21.0
Sand	45.4	47.4
Silty sand	18.2	26.3
Silt	9.1	5.3
Clay	--	--
Total	100.0	100.0

Table 62.--Bathymetric occurrence of Bathyarca anomala, based on 9 samples and 129 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	22.3	38.8
100-199	44.4	58.1
200-499	33.3	3.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 63.--Occurrence of Bathyarca anomala in bottom sediments, based on 8 samples and 57 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	12.5	3.5
Till	37.5	89.6
Shell	--	--
Sand-shell	--	--
Sand	12.5	1.7
Silty sand	12.5	1.7
Silt	--	--
Clay	25.0	3.5
Total	100.0	100.0

Table 64.--Bathymetric occurrence of Bathyarca pectunculoides, based on 157 samples and 1,297 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	5.1	6.7
100-199	61.1	72.9
200-499	33.8	20.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 65.--Occurrence of Bathyarca pectunculoides in bottom sediments, based on 140 samples and 1,095 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	15.7	43.8
Sand-gravel	5.0	1.2
Till	20.0	31.9
Shell	--	--
Sand-shell	--	--
Sand	7.9	2.7
Silty sand	35.7	13.8
Silt	5.7	2.7
Clay	10.0	3.9
Total	100.0	100.0

Table 66.--Bathymetric occurrence of Bathyarca sp., based on 9 samples and 14 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	66.7	78.6
200-499	33.3	21.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 67.--Occurrence of Bathyarca sp. in bottom sediments, based on 9 samples and 14 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	11.1	7.1
Till	11.1	7.1
Shell	11.1	14.3
Sand-shell	--	--
Sand	11.1	7.1
Silty sand	22.3	14.3
Silt	--	--
Clay	33.3	50.1
Total	100.0	100.0

Table 68. --Bathymetric occurrence of Limopsidae, based on 16 samples and 1,052 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	6.2	0.2
25-49	--	--
50-99	6.2	0.1
100-199	50.0	2.9
200-499	25.0	96.5
500-999	12.6	0.3
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 69. --Occurrence of Limopsidae in bottom sediments, based on 16 samples and 1,052 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	6.2	0.2
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	18.8	0.5
Sand	50.0	98.8
Silty sand	12.5	0.3
Silt	12.5	0.2
Clay	--	--
Total	100.0	100.0

Table 70. --Bathymetric occurrence of Limopsis affinis, based on 4 samples and 10 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	100.0	100.0
2000-3999	--	--
Total	100.0	100.0

Table 71. --Occurrence of Limopsis affinis in bottom sediments, based on 4 samples and 10 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	25.0	40.0
Silt	50.0	20.0
Clay	25.0	40.0
Total	100.0	100.0

Table 72. --Bathymetric occurrence of Limopsis cristata, based on three samples and four specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	33.3	25.0
25-49	--	--
50-99	--	--
100-199	--	--
200-499	33.3	25.0
500-999	--	--
1000-1999	33.3	50.0
2000-3999	--	--
Total	100.0	100.0

Table 73. --Occurrence of Limopsis cristata in bottom sediments, based on three samples and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	66.7	50.0
Silt	33.3	50.0
Clay	--	--
Total	100.0	100.0

Table 74. --Bathymetric occurrence of Limopsis minuta, based on 13 samples and 30 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	7.7	3.3
25-49	--	--
50-99	--	--
100-199	--	--
200-499	7.7	3.3
500-999	23.1	33.3
1000-1999	61.5	60.1
2000-3999	--	--
Total	100.0	100.0

Table 75. --Occurrence of Limopsis minuta in bottom sediments, based on 13 samples and 30 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	7.7	3.3
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	7.7	20.0
Silty sand	30.8	23.3
Silt	30.8	16.7
Clay	23.0	36.7
Total	100.0	100.0

Table 76. --Bathymetric occurrence of Limopsis sulcata, based on 6 samples and 21 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	16.7	47.6
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	83.3	52.4
2000-3999	--	--
Total	100.0	100.0

Table 77. --Occurrence of Limopsis sulcata in bottom sediments, based on 6 samples and 21 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	33.3	14.3
Silt	33.3	33.3
Clay	33.3	52.4
Total	100.0	100.0

Table 78. --Bathymetric occurrence of Limopsis sp., based on two samples and two specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	50.0	50.0
500-999	--	--
1000-1999	50.0	50.0
2000-3999	--	--
Total	100.0	100.0

Table 79. --Occurrence of Limopsis sp. in bottom sediments, based on two samples and two specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	50.0	50.0
Silt	50.0	50.0
Clay	--	--
Total	100.0	100.0

Table 80. --Bathymetric occurrence of Glycymeris pectinata, based on 20 samples and 40 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	30.0	30.0
25-49	55.0	37.5
50-99	--	--
100-199	15.0	32.5
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 81. --Occurrence of Glycymeris pectinata in bottom sediments, based on 20 samples and 40 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	5.0	10.0
Till	--	--
Shell	--	--
Sand-shell	40.0	55.0
Sand	50.0	30.0
Silty sand	5.0	5.0
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 82. --Bathymetric occurrence of Glycymeris sp., based on 23 samples and 48 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	21.7	29.2
25-49	39.1	41.6
50-99	--	--
100-199	4.4	2.1
200-499	30.4	22.9
500-999	4.4	4.2
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 83. --Occurrence of Glycymeris sp. in bottom sediments, based on 23 samples and 48 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	4.4	2.1
Sand-shell	21.7	14.6
Sand	73.9	83.3
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 84. --Bathymetric occurrence of Mytilidae, based on 33 samples and 201 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	9.1	2.0
25-49	6.1	21.4
50-99	21.2	17.9
100-199	36.4	49.2
200-499	24.2	7.5
500-999	3.0	2.0
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 85. --Occurrence of Mytilidae in bottom sediments, based on 26 samples and 171 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	7.7	19.9
Sand-gravel	11.6	41.5
Till	7.7	2.4
Shell	--	--
Sand-shell	3.8	14.0
Sand	19.2	2.9
Silty sand	7.7	7.6
Silt	15.4	6.4
Clay	26.9	5.3
Total	100.0	100.0

Table 86.--Bathymetric occurrence of Crenella decussata, based on 83 samples and 443 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.6	0.9
25-49	12.0	18.1
50-99	61.5	67.9
100-199	20.5	12.6
200-499	2.4	0.5
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 87.--Occurrence of Crenella decussata in bottom sediments, based on 81 samples and 439 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.7	4.1
Sand-gravel	7.4	3.9
Till	1.2	0.5
Shell	2.5	0.6
Sand-shell	--	--
Sand	34.6	25.1
Silty sand	29.6	56.0
Silt	3.7	0.9
Clay	17.3	8.9
Total	100.0	100.0

Table 88.--Bathymetric occurrence of Crenella glandula, based on 229 samples and 1,835 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.5	6.4
25-49	8.7	45.8
50-99	54.6	30.7
100-199	29.7	16.2
200-499	3.5	0.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 89.--Occurrence of Crenella glandula in bottom sediments, based on 205 samples and 1,696 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	7.8	6.7
Sand-gravel	7.8	5.8
Till	15.6	33.4
Shell	1.5	0.3
Sand-shell	2.3	0.6
Sand	33.7	21.3
Silty sand	17.1	27.0
Silt	2.0	1.2
Clay	12.2	3.7
Total	100.0	100.0

Table 90.--Bathymetric occurrence of Crenella sp., based on 35 samples and 69 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	14.3	7.3
25-49	14.3	13.0
50-99	28.6	18.8
100-199	37.0	56.5
200-499	--	--
500-999	--	--
1000-1999	2.9	2.9
2000-3999	2.9	1.5
Total	100.0	100.0

Table 91.--Occurrence of Crenella sp. in bottom sediments, based on 32 samples and 63 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	12.5	9.5
Sand-gravel	9.4	28.6
Till	--	--
Shell	3.1	11.1
Sand-shell	6.2	3.2
Sand	34.4	27.0
Silty sand	21.9	11.1
Silt	3.1	3.2
Clay	9.4	6.3
Total	100.0	100.0

Table 92.--Bathymetric occurrence of Dacrydium vitreum, based on 94 samples and 519 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	1.1	0.4
50-99	--	--
100-199	52.1	71.3
200-499	38.3	26.2
500-999	2.1	0.4
1000-1999	5.3	1.5
2000-3999	1.1	0.2
Total	100.0	100.0

Table 93.--Occurrence of Dacrydium vitreum in bottom sediments, based on 92 samples and 511 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	4.3	2.9
Sand-gravel	2.2	0.4
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	12.0	5.5
Silty sand	18.5	14.3
Silt	8.7	3.3
Clay	54.3	73.6
Total	100.0	100.0

Table 94. --Bathymetric occurrence of Geukensia demissa, based on 10 samples and 36 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	100.0	100.0
25-49	--	--
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 95. --Occurrence of Geukensia demissa in bottom sediments, based on 4 samples and 18 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	25.0	5.6
Silty sand	75.0	94.4
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 96. --Bathymetric occurrence of Modiolus modiolus, based on 127 samples and 1,132 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.4	0.3
25-49	22.8	58.3
50-99	55.1	26.8
100-199	17.3	9.7
200-499	2.4	4.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 97. --Occurrence of Modiolus modiolus in bottom sediments, based on 98 samples and 953 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	17.4	4.7
Sand-gravel	23.5	23.5
Till	6.1	3.6
Shell	5.1	0.8
Sand-shell	6.1	54.4
Sand	33.7	9.9
Silty sand	6.1	2.9
Silt	1.0	0.1
Clay	1.0	0.1
Total	100.0	100.0

Table 98. --Bathymetric occurrence of Musculus corrugatus, based on 11 samples and 88 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	18.2	2.3
50-99	72.7	75.0
100-199	9.1	22.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 99. --Occurrence of Musculus corrugatus in bottom sediments, based on 10 samples and 87 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	40.0	60.9
Till	30.0	33.3
Shell	10.0	3.5
Sand-shell	--	--
Sand	20.0	2.3
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 100.--Bathymetric occurrence of Musculus discors, based on 80 samples and 457 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	17.5	53.8
50-99	58.8	40.3
100-199	23.7	5.9
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 101.--Occurrence of Musculus discors in bottom sediments, based on 57 samples and 417 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	21.1	5.1
Sand-gravel	42.1	82.0
Till	15.8	4.3
Shell	1.7	3.8
Sand-shell	3.5	0.8
Sand	8.8	2.4
Silty sand	1.7	0.2
Silt	--	--
Clay	5.3	1.4
Total	100.0	100.0

Table 102.--Bathymetric occurrence of Musculus niger, based on 115 samples and 406 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.6	1.0
25-49	20.0	24.4
50-99	54.8	58.1
100-199	21.7	16.3
200-499	0.9	0.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 103.--Occurrence of Musculus niger in bottom sediments, based on 105 samples and 372 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	9.5	7.0
Sand-gravel	15.2	19.9
Till	6.7	24.5
Shell	1.0	0.5
Sand-shell	1.9	0.5
Sand	40.0	25.2
Silty sand	10.5	9.7
Silt	5.7	4.6
Clay	9.5	8.1
Total	100.0	100.0

Table 104.--Bathymetric occurrence of Musculus sp., based on 13 samples and 75 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	7.7	10.7
50-99	53.8	22.7
100-199	15.4	57.3
200-499	23.1	9.3
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 105.--Occurrence of Musculus sp. in bottom sediments, based on 10 samples and 71 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	20.0	60.6
Sand-gravel	30.0	26.8
Till	10.0	4.2
Shell	--	--
Sand-shell	--	--
Sand	10.0	1.4
Silty sand	10.0	1.4
Silt	--	--
Clay	20.0	5.6
Total	100.0	100.0

Table 106.--Bathymetric occurrence of Mytilus edulis, based on 106 samples and 5,269 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	34.0	14.5
25-49	21.7	72.5
50-99	33.0	12.4
100-199	8.5	0.5
200-499	2.8	0.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 107.--Occurrence of Mytilus edulis in bottom sediments, based on 62 samples and 1,083 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	6.5	2.7
Sand-gravel	16.2	43.8
Till	3.2	1.1
Shell	1.6	0.3
Sand-shell	--	--
Sand	43.5	12.9
Silty sand	22.6	37.8
Silt	1.6	0.1
Clay	4.8	1.3
Total	100.0	100.0

Table 108.--Bathymetric occurrence of Pectinidae, based on 14 samples and 23 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	7.1	4.4
25-49	35.7	30.4
50-99	14.3	8.7
100-199	28.6	21.7
200-499	14.3	34.8
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 109.--Occurrence of Pectinidae in bottom sediments, based on 12 samples and 21 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.3	4.8
Sand-gravel	--	--
Till	--	--
Shell	8.3	9.5
Sand-shell	25.0	14.3
Sand	33.4	28.6
Silty sand	16.7	9.5
Silt	8.3	33.3
Clay	--	--
Total	100.0	100.0

Table110.--Bathymetric occurrence of Chlamys islandica, based on 76 samples and 361 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	3.9	0.9
50-99	38.2	74.8
100-199	52.6	22.4
200-499	5.3	1.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table111.--Occurrence of Chlamys islandica in bottom sediments, based on 48 samples and 276 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	52.1	59.8
Sand-gravel	18.7	31.9
Till	10.4	2.5
Shell	--	--
Sand-shell	--	--
Sand	10.4	4.0
Silty sand	2.1	0.7
Silt	2.1	0.4
Clay	4.2	0.7
Total	100.0	100.0

Table 112.--Bathymetric occurrence of Cyclopecten nanus, based on 3 samples and 21 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	66.7	52.4
100-199	33.3	47.6
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table113.--Occurrence of Cyclopecten nanus in bottom sediments, based on 3 samples and 21 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	100.0	100.0
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table114.--Bathymetric occurrence of Cyclopecten pustulosus, based on 30 samples and 58 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	63.3	53.5
200-499	30.0	43.1
500-999	6.7	3.4
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table115.--Occurrence of Cyclopecten pustulosus in bottom sediments, based on 25 samples and 44 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.0	22.8
Sand-gravel	24.0	15.9
Till	20.0	31.8
Shell	--	--
Sand-shell	--	--
Sand	24.0	13.6
Silty sand	20.0	13.6
Silt	--	--
Clay	4.0	2.3
Total	100.0	100.0

Table 116.--Bathymetric occurrence of Delectopecten vitreus, based on 3 samples and 12 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	66.7	66.7
500-999	33.3	33.3
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 117.--Occurrence of Delectopecten vitreus in bottom sediments, based on one sample and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	100.0	100.0
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table118. --Bathymetric occurrence of Placopecten magellanicus, based on 164 samples and 1,225 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	6.7	3.5
50-99	59.8	61.5
100-199	30.5	33.8
200-499	3.0	1.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 119.--Occurrence of Placopecten magellanicus in bottom sediments, based on 98 samples and 622 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	15.3	4.7
Sand-gravel	19.4	50.3
Till	--	--
Shell	1.0	0.5
Sand-shell	5.2	2.6
Sand	38.8	30.2
Silty sand	7.1	3.8
Silt	2.0	0.5
Clay	11.2	7.4
Total	100.0	100.0

Table 120.--Bathymetric occurrence of Propeamussium thalassinum, based on 6 samples and 28 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	16.7	7.1
100-199	66.6	50.0
200-499	16.7	42.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 121. --Occurrence of Propeamussium thalassinum in bottom sediments, based on 4 samples and 26 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	25.0	7.8
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	25.0	46.1
Silty sand	50.0	46.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 122. --Bathymetric occurrence of Plicatula gibbosa, based on four samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	25.0	33.3
25-49	50.0	33.3
50-99	25.0	33.3
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 123.--Occurrence of Plicatula gibbosa in bottom sediments, based on four samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	75.0	83.3
Sand	25.0	16.7
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 124.--Bathymetric occurrence of Anomia simplex, based on 301 samples and 10,880 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.0	0.2
25-49	5.6	9.6
50-99	47.2	70.3
100-199	28.3	12.5
200-499	15.6	7.3
500-999	0.3	<0.1
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 125.--Occurrence of Anomia simplex in bottom sediments, based on 225 samples and 8,978 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	14.3	17.2
Sand-gravel	20.0	31.2
Till	12.5	3.4
Shell	1.3	0.7
Sand-shell	4.4	5.3
Sand	32.9	38.3
Silty sand	8.0	1.8
Silt	1.3	1.1
Clay	5.3	1.0
Total	100.0	100.0

Table 126.--Bathymetric occurrence of Anomia squamula, based on 279 samples and 4,231 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	1.8	0.2
25-49	5.4	11.9
50-99	39.7	41.7
100-199	35.1	27.1
200-499	17.6	19.1
500-999	0.4	<0.1
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 127.--Occurrence of Anomia squamula in bottom sediments, based on 217 samples and 3,083 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	17.6	22.4
Sand-gravel	22.1	29.9
Till	18.4	13.1
Shell	1.8	1.2
Sand-shell	0.9	0.4
Sand	24.5	18.5
Silty sand	8.3	4.3
Silt	0.9	5.5
Clay	5.5	4.7
Total	100.0	100.0

Table 128.--Bathymetric occurrence of Limatula subauriculata, based on 14 samples and 328 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	21.4	1.8
200-499	21.4	92.7
500-999	14.3	0.9
1000-1999	42.9	4.6
2000-3999	--	--
Total	100.0	100.0

Table 129.--Occurrence of Limatula subauriculata in bottom sediments, based on 14 samples and 328 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	7.1	0.3
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	28.6	93.9
Silty sand	28.6	3.4
Silt	35.7	2.4
Clay	--	--
Total	100.0	100.0

Table 130.--Bathymetric occurrence of Limatula sp., based on 14 samples and 22 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	14.3	27.3
25-49	21.5	13.6
50-99	14.3	9.1
100-199	7.1	9.1
200-499	35.7	36.4
500-999	7.1	4.5
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 131.--Occurrence of Limatula sp. in bottom sediments, based on 14 samples and 22 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	7.2	4.5
Till	--	--
Shell	--	--
Sand-shell	21.4	31.9
Sand	21.4	18.2
Silty sand	7.1	4.5
Silt	42.9	40.9
Clay	--	--
Total	100.0	100.0

Table 132.--Bathymetric occurrence of Lucinidae , based on 44 samples and 166 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	81.8	93.4
25-49	13.7	5.4
50-99	4.5	1.2
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 133.--Occurrence of Lucinidae in bottom sediments, based on 44 samples and 166 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	2.3	1.2
Sand-shell	22.7	11.4
Sand	72.7	86.8
Silty sand	2.3	0.6
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 134.--Bathymetric occurrence of Lucinoma blakeana, based on 6 samples and 34 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	50.0	38.3
100-199	33.3	58.8
200-499	16.7	2.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 135.--Occurrence of Lucinoma blakeana in bottom sediments, based on 6 samples and 34 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	50.0	38.2
Silty sand	50.0	61.8
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 136.--Bathymetric occurrence of Lucinoma filosa, based on 241 samples and 2,266 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.4	<0.1
25-49	2.5	0.4
50-99	44.8	31.7
100-199	38.2	51.4
200-499	12.0	16.3
500-999	1.7	0.2
1000-1999	0.4	<0.1
2000-3999	--	--
Total	100.0	100.0

Table 137.--Occurrence of Lucinoma filosa in bottom sediments, based on 241 samples and 2,266 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	1.7	0.4
Sand	42.3	39.4
Silty sand	37.3	48.1
Silt	5.0	1.4
Clay	13.7	10.7
Total	100.0	100.0

Table 138.--Bathymetric occurrence of Lucinoma sp., based on four samples and four specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	25.0	25.0
25-49	--	--
50-99	--	--
100-199	--	--
200-499	25.0	25.0
500-999	25.0	25.0
1000-1999	25.0	25.0
2000-3999	--	--
Total	100.0	100.0

Table 139.--Occurrence of Lucinoma sp. in bottom sediments, based on four samples and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	75.0	75.0
Silt	25.0	25.0
Clay	--	--
Total	100.0	100.0

Table 140.--Bathymetric occurrence of Parvilucina blanda, based on five samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	20.0	16.7
25-49	80.0	83.3
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 141.--Occurrence of Parvilucina blanda in bottom sediments, based on five samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	20.0	16.7
Sand	60.0	66.6
Silty sand	20.0	16.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 142.--Bathymetric occurrence of Thyasira croulinensis, based on three samples and four specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	33.3	25.0
50-99	33.3	25.0
100-199	--	--
200-499	33.3	50.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 143.--Occurrence of Thyasira croulinensis in bottom sediments, based on three samples and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	33.3	25.0
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	33.3	50.0
Silt	33.3	25.0
Clay	--	--
Total	100.0	100.0

Table 144.--Bathymetric occurrence of Thyasira elliptica, based on 4 samples and 12 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	75.0	91.7
100-199	25.0	8.3
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 145.--Occurrence of Thyasira elliptica in bottom sediments, based on 4 samples and 12 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	25.0	33.3
Silty sand	--	--
Silt	--	--
Clay	75.0	66.7
Total	100.0	100.0

Table 146.--Bathymetric occurrence of Thyasira equalis, based on 44 samples and 309 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	4.5	2.9
50-99	13.6	18.8
100-199	34.1	27.9
200-499	34.1	25.2
500-999	11.4	24.9
1000-1999	--	--
2000-3999	2.3	0.3
Total	100.0	100.0

Table 147.--Occurrence of Thyasira equalis in bottom sediments, based on 44 samples and 309 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	11.4	12.3
Silty sand	31.8	35.9
Silt	6.8	3.6
Clay	50.0	48.2
Total	100.0	100.0

Table 148.--Bathymetric occurrence of Thyasira ferruginea, based on 92 samples and 1,381 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	1.1	0.1
50-99	1.1	0.1
100-199	--	--
200-499	7.6	6.4
500-999	28.3	54.0
1000-1999	36.9	19.8
2000-3999	25.0	19.6
Total	100.0	100.0

Table 149.--Occurrence of Thyasira ferruginea in bottom sediments, based on 92 samples and 1,381 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	8.7	6.4
Silty sand	26.1	45.2
Silt	50.0	43.0
Clay	15.2	5.4
Total	100.0	100.0

Table 150.--Bathymetric occurrence of Thyasira flexuosa, based on 104 samples and 1,044 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	1.0	0.2
25-49	8.6	6.6
50-99	30.8	59.2
100-199	33.6	16.7
200-499	22.1	13.3
500-999	2.9	3.9
1000-1999	1.0	0.1
2000-3999	--	--
Total	100.0	100.0

Table 151.--Occurrence of Thyasira flexuosa in bottom sediments, based on 104 samples and 1,044 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.8	0.4
Sand-gravel	1.0	1.0
Till	2.9	1.3
Shell	1.0	0.6
Sand-shell	1.0	0.1
Sand	27.8	12.1
Silty sand	20.2	38.3
Silt	10.6	14.7
Clay	31.7	31.5
Total	100.0	100.0

Table 152.--Bathymetric occurrence of Thyasira flexuosa forma gouldii, based on 37 samples and 415 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	5.4	8.9
50-99	56.8	54.5
100-199	21.6	5.1
200-499	8.1	4.3
500-999	8.1	27.2
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 153.--Occurrence of Thyasira flexuosa forma gouldii in bottom sediments, based on 37 samples and 415 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	2.7	0.5
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	32.5	10.6
Silty sand	37.8	45.3
Silt	5.4	9.6
Clay	21.6	34.0
Total	100.0	100.0

Table 154.--Bathymetric occurrence of Thyasira pygmaea, based on 8 samples and 64 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	25.0	28.1
100-199	12.5	1.6
200-499	37.5	45.3
500-999	25.0	25.0
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 155.--Occurrence of Thyasira pygmaea in bottom sediments, based on 8 samples and 64 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	12.5	3.1
Silty sand	37.5	40.6
Silt	--	--
Clay	50.0	56.3
Total	100.0	100.0

Table 156.--Bathymetric occurrence of Thyasira subovata, based on 7 samples and 18 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	57.1	44.4
100-199	--	--
200-499	28.6	50.0
500-999	14.3	5.6
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 157.--Occurrence of Thyasira subovata in bottom sediments, based on 7 samples and 18 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	28.6	27.8
Silty sand	14.3	11.1
Silt	42.8	55.5
Clay	14.3	5.6
Total	100.0	100.0

Table 158.--Bathymetric occurrence of Thyasira trisinuata, based on 133 samples and 1,079 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.7	0.4
25-49	4.6	6.3
50-99	60.9	61.6
100-199	21.8	16.9
200-499	7.6	11.6
500-999	3.0	2.9
1000-1999	0.7	0.2
2000-3999	0.7	0.1
Total	100.0	100.0

Table 159.--Occurrence of Thyasira trisinuata in bottom sediments, based on 133 samples and 1,079 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	0.8	0.1
Sand-gravel	0.8	2.2
Till	1.5	1.6
Shell	--	--
Sand-shell	1.5	1.1
Sand	35.3	25.9
Silty sand	39.8	52.5
Silt	5.3	4.9
Clay	15.0	11.7
Total	100.0	100.0

Table 160.--Bathymetric occurrence of Thyasira sp., based on 141 samples and 731 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.7	0.3
25-49	4.3	4.1
50-99	12.8	17.5
100-199	31.2	30.6
200-499	34.7	22.7
500-999	10.6	23.2
1000-1999	4.3	1.2
2000-3999	1.4	0.4
Total	100.0	100.0

Table 161.--Occurrence of Thyasira sp. in bottom sediments, based on 134 samples and 701 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	0.7	0.1
Sand-gravel	3.7	1.7
Till	4.5	3.4
Shell	--	--
Sand-shell	0.7	0.1
Sand	10.5	11.3
Silty sand	29.9	31.0
Silt	15.7	19.4
Clay	34.3	33.0
Total	100.0	100.0

Table 162.--Bathymetric occurrence of Diplodonta sp., based on 58 samples and 90 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	43.1	37.8
25-49	39.7	34.4
50-99	13.8	21.1
100-199	--	--
200-499	1.7	1.1
500-999	--	--
1000-1999	1.7	5.6
2000-3999	--	--
Total	100.0	100.0

Table 163.--Occurrence of Diplodonta sp. in bottom sediments, based on 58 samples and 90 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	19.0	17.8
Sand	74.1	73.3
Silty sand	5.2	3.3
Silt	1.7	5.6
Clay	--	--
Total	100.0	100.0

Table 164.--Bathymetric occurrence of Arcinella cornuta, based on three samples and three specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	33.3	33.3
25-49	66.7	66.7
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 165.--Occurrence of Arcinella cornuta in bottom sediments, based on three samples and three specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	33.3	33.3
Sand	66.7	66.7
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 166.--Bathymetric occurrence of Cyclocardia borealis, based on 473 samples and 8,839 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.0	0.4
25-49	12.7	11.3
50-99	55.8	62.6
100-199	24.1	24.7
200-499	4.4	1.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 167.--Occurrence of Cyclocardia borealis in bottom sediments, based on 430 samples and 8,694 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	7.4	3.5
Sand-gravel	10.2	4.3
Till	12.3	38.4
Shell	1.2	0.4
Sand-shell	3.7	0.5
Sand	36.3	15.0
Silty sand	13.1	15.2
Silt	2.1	0.6
Clay	13.7	22.1
Total	100.0	100.0

Table 168.--Bathymetric occurrence of Cyclocardia novangliae, based on 26 samples and 89 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	7.7	2.2
50-99	65.4	89.9
100-199	23.1	6.6
200-499	3.8	1.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 169.--Occurrence of Cyclocardia novangliae in bottom sediments, based on 25 samples and 88 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	20.0	6.8
Sand-gravel	44.0	43.2
Till	12.0	27.3
Shell	8.0	18.2
Sand-shell	4.0	1.1
Sand	8.0	2.3
Silty sand	--	--
Silt	--	--
Clay	4.0	1.1
Total	100.0	100.0

Table 170.--Bathymetric occurrence of Cyclocardia sp., based on 16 samples and 22 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	50.0	59.1
25-49	37.5	31.8
50-99	12.5	9.1
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 171.--Occurrence of Cyclocardia sp. in bottom sediments, based on 16 samples and 22 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	6.2	4.5
Sand-gravel	--	--
Till	--	--
Shell	6.2	4.5
Sand-shell	50.0	50.0
Sand	31.4	31.9
Silty sand	6.2	9.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 172.--Bathymetric occurrence of Pleuromeris tridentata, based on 61 samples and 168 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	42.7	32.1
25-49	44.3	56.0
50-99	9.8	9.5
100-199	1.6	1.2
200-499	1.6	1.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 173.--Occurrence of Pleuromeris tridentata in bottom sediments, based on 61 samples and 168 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.6	2.4
Sand-gravel	--	--
Till	--	--
Shell	6.6	7.1
Sand-shell	41.0	23.2
Sand	47.5	65.5
Silty sand	3.3	1.8
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 174.--Bathymetric occurrence of Pteromeris perplana, based on 14 samples and 28 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	21.4	10.7
25-49	78.6	89.3
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 175.--Occurrence of Pteromeris perplana in bottom sediments, based on 14 samples and 28 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	7.2	3.6
Till	--	--
Shell	14.3	7.1
Sand-shell	21.4	35.7
Sand	57.1	53.6
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 176.--Bathymetric occurrence of Astarte borealis, based on 18 samples and 22 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	11.1	9.1
50-99	88.9	90.9
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 177.--Occurrence of Astarte borealis in bottom sediments, based on 17 samples and 21 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	35.3	28.6
Sand-gravel	35.3	42.9
Till	--	--
Shell	--	--
Sand-shell	5.9	4.7
Sand	23.5	23.8
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 178.--Bathymetric occurrence of Astarte castanea, based on 105 samples and 457 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	22.8	30.4
25-49	36.2	33.7
50-99	36.2	34.6
100-199	4.8	1.3
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 179.--Occurrence of Astarte castanea in bottom sediments, based on 94 samples and 384 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	4.2	2.1
Sand-gravel	13.8	24.2
Till	--	--
Shell	3.2	1.6
Sand-shell	9.6	7.5
Sand	64.9	63.3
Silty sand	3.2	1.0
Silt	--	--
Clay	1.1	0.3
Total	100.0	100.0

Table 180.--Bathymetric occurrence of Astarte crenata subequilatera, based on 433 samples and 4,972 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	0.2	0.1
25-49	4.2	7.7
50-99	32.6	35.8
100-199	41.1	44.7
200-499	21.2	11.5
500-999	0.7	0.2
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 181.--Occurrence of Astarte crenata subequilatera in bottom sediments, based on 391 samples and 4,649 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	14.3	14.6
Sand-gravel	11.3	2.1
Till	21.7	49.3
Shell	1.8	0.7
Sand-shell	0.5	0.5
Sand	17.9	13.6
Silty sand	16.9	12.9
Silt	2.8	1.2
Clay	12.8	5.1
Total	100.0	100.0

Table 182.--Bathymetric occurrence of Astarte elliptica, based on 42 samples and 317 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.4	0.6
25-49	9.8	9.5
50-99	75.6	83.2
100-199	12.2	6.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 183.--Occurrence of Astarte elliptica in bottom sediments, based on 31 samples and 284 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	12.9	17.6
Sand-gravel	22.6	3.9
Till	19.4	20.8
Shell	9.7	41.2
Sand-shell	3.2	0.3
Sand	19.3	3.9
Silty sand	3.2	3.5
Silt	--	--
Clay	9.7	8.8
Total	100.0	100.0

Table 184.--Bathymetric occurrence of Astarte nana, based on 4 samples and 18 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	--	--
200-499	50.0	33.3
500-999	50.0	66.7
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 185.--Occurrence of Astarte nana in bottom sediments, based on 4 samples and 18 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	25.0	11.1
Silty sand	50.0	66.7
Silt	25.0	22.2
Clay	--	--
Total	100.0	100.0

Table 186.--Bathymetric occurrence of Astarte quadrans, based on 28 samples and 48 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	14.3	16.7
25-49	32.2	22.9
50-99	46.4	56.2
100-199	7.1	4.2
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 187.--Occurrence of Astarte quadrans in bottom sediments, based on 26 samples and 46 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	19.3	13.0
Till	3.8	2.2
Shell	--	--
Sand-shell	7.7	4.4
Sand	69.2	80.4
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 188.--Bathymetric occurrence of Astarte undata, based on 444 samples and 4,705 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.0	0.6
25-49	11.8	10.1
50-99	55.2	58.5
100-199	27.7	30.0
200-499	2.7	0.6
500-999	0.6	0.2
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 189.--Occurrence of Astarte undata in bottom sediments, based on 444 samples and 4,705 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	12.2	8.8
Sand-gravel	10.7	2.4
Till	13.8	37.2
Shell	2.7	6.4
Sand-shell	1.7	0.8
Sand	30.3	16.7
Silty sand	12.7	16.2
Silt	3.2	1.4
Clay	12.7	10.1
Total	100.0	100.0

Table 190.--Bathymetric occurrence of Astarte sp., based on 94 samples and 533 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	1.1	1.1
25-49	4.3	2.2
50-99	37.2	39.6
100-199	28.7	23.3
200-499	19.1	16.9
500-999	9.6	16.9
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 191.--Occurrence of Astarte sp. in bottom sediments, based on 88 samples and 515 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.4	1.4
Sand-gravel	9.1	5.2
Till	9.1	15.5
Shell	--	--
Sand-shell	--	--
Sand	42.1	57.1
Silty sand	17.0	13.2
Silt	6.8	3.5
Clay	12.5	4.1
Total	100.0	100.0

Table 192.--Bathymetric occurrence of Crassinella lunulata, based on 87 samples and 226 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	49.4	53.5
25-49	40.3	38.9
50-99	5.7	3.5
100-199	4.6	4.1
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 193.--Occurrence of Crassinella lunulata in bottom sediments, based on 87 samples and 226 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.3	3.1
Sand-gravel	2.3	1.3
Till	--	--
Shell	4.6	3.1
Sand-shell	36.8	31.9
Sand	46.0	46.9
Silty sand	8.0	13.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 194.--Bathymetric occurrence of Crassinella sp., based on three samples and nine specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	66.7	55.6
25-49	33.3	44.4
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 195.--Occurrence of Crassinella sp. in bottom sediments, based on three samples and nine specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	33.3	22.2
Sand	66.7	77.8
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 196.--Bathymetric occurrence of Cerastoderma pinnulatum, based on 466 samples and 3,317 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	4.5	40.2
25-49	18.7	12.9
50-99	43.5	35.0
100-199	27.3	10.1
200-499	5.8	1.7
500-999	--	--
1000-1999	0.2	<0.1
2000-3999	--	--
Total	100.0	100.0

Table 197.--Occurrence of Cerastoderma pinnulatum in bottom sediments, based on 403 samples and 1,825 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.9	7.7
Sand-gravel	13.7	8.4
Till	5.9	2.5
Shell	1.6	4.5
Sand-shell	5.7	7.5
Sand	43.7	58.3
Silty sand	9.9	6.4
Silt	2.2	0.8
Clay	8.4	3.9
Total	100.0	100.0

Table 198.--Bathymetric occurrence of Clinocardium ciliatum, based on four samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	75.0	83.3
100-199	25.0	16.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 199.--Occurrence of Clinocardium ciliatum in bottom sediments, based on four samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	33.3	25.0
Sand-gravel	--	--
Till	33.3	50.0
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	--	--
Silt	--	--
Clay	33.3	25.0
Total	100.0	100.0

Table 200.--Bathymetric occurrence of Laevicardium mortoni, based on 47 samples and 104 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	49.0	56.7
25-49	46.8	39.4
50-99	4.2	3.9
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 201.--Occurrence of Laevicardium mortoni in bottom sediments, based on 36 samples and 76 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	5.6	3.9
Till	--	--
Shell	--	--
Sand-shell	33.3	27.6
Sand	55.5	59.3
Silty sand	5.6	9.2
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 202.--Bathymetric occurrence of Mulinia lateralis, based on 51 samples and 897 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	84.3	98.4
25-49	13.7	1.5
50-99	2.0	0.1
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 203.--Occurrence of Mulinia lateralis in bottom sediments, based on 37 samples and 754 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	2.7	0.5
Till	--	--
Shell	--	--
Sand-shell	2.7	0.4
Sand	29.7	23.5
Silty sand	29.7	8.1
Silt	10.9	51.5
Clay	24.3	16.0
Total	100.0	100.0

Table 204.--Bathymetric occurrence of Spisula solidissima, based on 164 samples and 743 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	41.5	67.1
25-49	40.2	26.7
50-99	16.5	5.8
100-199	1.8	0.4
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 205.--Occurrence of Spisula solidissima in bottom sediments, based on 126 samples and 668 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.7	5.4
Sand-gravel	4.8	1.2
Till	--	--
Shell	2.4	1.2
Sand-shell	11.9	9.6
Sand	69.0	81.8
Silty sand	2.4	0.6
Silt	0.8	0.2
Clay	--	--
Total	100.0	100.0

Table 206.--Bathymetric occurrence of Ervilia concentrica, based on 112 samples and 592 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	53.6	55.2
25-49	44.6	43.9
50-99	1.8	0.9
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 207.--Occurrence of Ervilia concentrica in bottom sediments, based on 112 samples and 592 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	0.9	1.4
Sand-gravel	0.9	0.3
Till	--	--
Shell	3.6	3.2
Sand-shell	27.7	30.4
Sand	63.3	61.4
Silty sand	2.7	3.0
Silt	0.9	0.3
Clay	--	--
Total	100.0	100.0

Table 208. --Bathymetric occurrence of Mesodesma arctatum, based on 2 samples and 52 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	100.0	100.0
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 209. --Occurrence of Mesodesma arctatum in bottom sediments, based on 2 samples and 52 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	50.0	3.8
Silt	--	--
Clay	50.0	96.2
Total	100.0	100.0

Table 210.--Bathymetric occurrence of Solenidae, based on 11 samples and 39 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	63.6	35.9
25-49	27.3	25.6
50-99	9.1	38.5
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 211.--Occurrence of Solenidae in bottom sediments, based on 10 samples and 24 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	10.0	4.2
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	30.0	20.8
Sand	50.0	62.5
Silty sand	10.0	12.5
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 212.--Bathymetric occurrence of Ensis directus, based on 206 samples and 2,150 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	45.1	67.4
25-49	37.9	29.5
50-99	16.5	3.1
100-199	0.5	<0.1
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 213.--Occurrence of Ensis directus in bottom sediments, based on 194 samples and 2,113 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.0	0.4
Sand-gravel	3.1	2.4
Till	--	--
Shell	3.1	0.7
Sand-shell	20.1	13.0
Sand	69.6	60.1
Silty sand	2.6	23.2
Silt	0.5	0.2
Clay	--	--
Total	100.0	100.0

Table 214.--Bathymetric occurrence of Siliqua costata, based on 32 samples and 104 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	15.6	11.5
25-49	31.3	41.4
50-99	46.9	39.4
100-199	3.1	6.7
200-499	3.1	1.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 215.--Occurrence of Siliqua costata in bottom sediments, based on 30 samples and 96 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	96.7	96.9
Silty sand	3.3	3.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 216.--Bathymetric occurrence of Tellinidae, based on 26 samples and 67 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	65.4	73.1
25-49	15.4	7.5
50-99	15.4	17.9
100-199	3.8	1.5
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 217.--Occurrence of Tellinidae in bottom sediments, based on 26 samples and 67 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.8	1.5
Sand-gravel	--	--
Till	--	--
Shell	7.7	3.0
Sand-shell	30.8	29.8
Sand	46.2	47.8
Silty sand	7.7	16.4
Silt	3.8	1.5
Clay	--	--
Total	100.0	100.0

Table 218.--Bathymetric occurrence of Macoma balthica, based on 45 samples and 783 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	42.2	76.5
25-49	8.9	4.1
50-99	24.4	16.1
100-199	17.8	2.9
200-499	6.7	0.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 219.--Occurrence of Macoma balthica in bottom sediments, based on 44 samples and 782 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.3	1.9
Sand-gravel	4.5	1.2
Till	2.3	2.8
Shell	--	--
Sand-shell	2.3	0.1
Sand	22.7	46.8
Silty sand	31.8	13.8
Silt	11.4	12.7
Clay	22.7	20.7
Total	100.0	100.0

Table 220.--Bathymetric occurrence of Macoma calcarea, based on 75 samples and 542 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	10.7	15.9
25-49	9.3	25.3
50-99	30.7	26.4
100-199	25.3	26.5
200-499	21.3	5.2
500-999	2.7	0.7
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 221.--Occurrence of Macoma calcarea in bottom sediments, based on 70 samples and 534 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.9	0.6
Sand-gravel	2.9	0.9
Till	17.1	6.9
Shell	--	--
Sand-shell	--	--
Sand	24.3	44.2
Silty sand	28.6	35.6
Silt	7.1	2.2
Clay	17.1	9.6
Total	100.0	100.0

Table 222.--Bathymetric occurrence of Macoma tenta, based on 22 samples and 708 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	68.2	97.9
25-49	13.6	0.6
50-99	18.2	1.5
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 223.--Occurrence of Macoma tenta in bottom sediments, based on 11 samples and 37 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	18.1	8.1
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	45.5	16.2
Silty sand	9.1	2.7
Silt	--	--
Clay	27.3	73.0
Total	100.0	100.0

Table 224.--Bathymetric occurrence of Macoma sp., based on 10 samples and 12 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	30.0	25.0
25-49	30.0	33.3
50-99	20.0	25.0
100-199	20.0	16.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 225.--Occurrence of Macoma sp. in bottom sediments, based on 8 samples and 10 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	12.5	10.0
Sand-gravel	12.5	10.0
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	50.0	50.0
Silty sand	--	--
Silt	25.0	30.0
Clay	--	--
Total	100.0	100.0

Table 226.--Bathymetric occurrence of Strigilla mirabilis, based on 9 samples and 12 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	66.7	[illegible]
25-49	[illegible]	[illegible]
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 227.--Occurrence of Strigilla mirabilis in bottom sediments, based on 9 samples and 12 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	33.3	25.0
Sand	66.7	75.0
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 228.--Bathymetric occurrence of Tellina agilis, based on 112 samples and 1,119 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	68.8	90.5
25-49	26.8	8.5
50-99	2.6	0.5
100-199	1.8	0.5
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 229.--Occurrence of Tellina agilis in bottom sediments, based on 101 samples and 1,075 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.0	0.1
Sand-gravel	2.0	0.2
Till	--	--
Shell	1.0	0.3
Sand-shell	9.9	4.2
Sand	72.2	91.9
Silty sand	10.9	2.7
Silt	1.0	0.2
Clay	2.0	0.4
Total	100.0	100.0

Table 230.--Bathymetric occurrence of Tellina versicolor, based on 58 samples and 297 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	63.8	86.5
25-49	32.8	12.5
50-99	3.4	1.0
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 231.--Occurrence of Tellina versicolor in bottom sediments, based on 58 samples and 297 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.7	0.3
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	29.4	30.6
Sand	67.2	68.4
Silty sand	1.7	0.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 232.--Bathymetric occurrence of Tellina sp., based on 70 samples and 151 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	44.3	52.9
25-49	38.6	33.8
50-99	11.4	10.6
100-199	5.7	2.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 233.--Occurrence of Tellina sp. in bottom sediments, based on 68 samples and 142 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	4.4	2.1
Sand-shell	19.1	18.3
Sand	67.6	71.1
Silty sand	5.9	3.6
Silt	1.5	0.7
Clay	1.5	4.2
Total	100.0	100.0

Table 234.--Bathymetric occurrence of Abra sp., based on 60 samples and 125 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	33.3	32.8
25-49	21.7	21.6
50-99	8.3	7.2
100-199	25.0	25.6
200-499	10.0	11.2
500-999	1.7	1.6
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 235.--Occurrence of Abra sp. in bottom sediments, based on 60 samples and 125 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.7	3.2
Sand-gravel	--	--
Till	--	--
Shell	6.7	8.0
Sand-shell	26.6	24.8
Sand	35.0	35.2
Silty sand	25.0	24.8
Silt	5.0	4.0
Clay	--	--
Total	100.0	100.0

Table 236.--Bathymetric occurrence of Semele bellastriata, based on 19 samples and 38 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	31.6	21.1
25-49	68.4	78.9
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 237.--Occurrence of Semele bellastriata in bottom sediments, based on 19 samples and 38 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	36.8	21.1
Sand	63.2	78.9
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 238.--Bathymetric occurrence of Semele nuculoides, based on 62 samples and 146 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	45.2	29.5
25-49	51.6	67.8
50-99	3.2	2.7
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 239.--Occurrence of Semele nuculoides in bottom sediments, based on 62 samples and 146 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	1.6	0.7
Sand-shell	27.4	23.3
Sand	66.2	58.9
Silty sand	4.8	17.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 240.--Bathymetric occurrence of Semele purpurascens, based on four samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	25.0	33.3
50-99	75.0	66.7
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 241.--Occurrence of Semele purpurascens in bottom sediments, based on four samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	50.0	50.0
Till	--	--
Shell	--	--
Sand-shell	25.0	16.7
Sand	25.0	33.3
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 242.--Bathymetric occurrence of Arctica islandica, based on 367 samples and 1,938 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.1	0.9
25-49	21.8	11.9
50-99	56.7	56.8
100-199	14.9	28.2
200-499	3.5	2.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 243.--Occurrence of Arctica islandica in bottom sediments, based on 326 samples and 1,825 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.4	0.9
Sand-gravel	4.0	0.9
Till	5.6	2.9
Shell	--	--
Sand-shell	4.7	2.9
Sand	55.8	32.0
Silty sand	8.9	12.4
Silt	5.6	4.9
Clay	12.0	43.1
Total	100.0	100.0

Table 244.--Bathymetric occurrence of Veneridae, based on 54 samples and 117 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	37.0	35.9
25-49	57.4	59.0
50-99	5.6	5.1
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 245.--Occurrence of Veneridae in bottom sediments, based on 54 samples and 117 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	5.6	5.1
Sand-gravel	3.7	2.6
Till	--	--
Shell	7.4	6.0
Sand-shell	44.4	47.0
Sand	35.2	35.0
Silty sand	3.7	4.3
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 246.--Bathymetric occurrence of Callista eucymata, based on 12 samples and 14 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	83.4	78.6
25-49	8.3	7.1
50-99	8.3	14.3
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table247.--Occurrence of Callista eucymata in bottom sediments, based on 12 samples and 14 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	8.3	7.1
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	25.0	28.6
Sand	58.4	57.2
Silty sand	8.3	7.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 248.--Bathymetric occurrence of Chione intapurpurea, based on eight samples and nine specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	87.5	88.9
25-49	12.5	11.1
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table249.--Occurrence of Chione intapurpurea in bottom sediments, based on eight samples and nine specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	50.0	55.6
Sand	50.0	44.4
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 250.--Bathymetric occurrence of Chione latilirata, based on 17 samples and 24 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	11.8	8.3
25-49	76.4	83.4
50-99	11.8	8.3
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 251.--Occurrence of Chione latilirata in bottom sediments, based on 17 samples and 24 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	29.4	33.3
Sand	70.6	66.7
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 252.--Bathymetric occurrence of Chione sp., based on 36 samples and 58 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	77.8	82.8
25-49	22.2	17.2
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 253.--Occurrence of Chione sp. in bottom sediments, based on 36 samples and 58 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	13.9	15.5
Sand-shell	38.9	37.9
Sand	41.7	43.1
Silty sand	5.5	3.5
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 254.--Bathymetric occurrence of Gemma gemma, based on 33 samples and 2,211 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	94.0	99.8
25-49	3.0	0.1
50-99	3.0	0.1
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 255.--Occurrence of Gemma gemma in bottom sediments, based on 16 samples and 408 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	6.2	79.6
Sand	75.0	15.0
Silty sand	18.8	5.4
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 256.--Bathymetric occurrence of Mercenaria mercenaria, based on 9 samples and 21 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	100.0	100.0
25-49	--	--
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 257.--Occurrence of Mercenaria mercenaria in bottom sediments, based on three samples and eight specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	33.3	25.0
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	66.7	75.0
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 258.--Bathymetric occurrence of Pitar morrhuanus, based on 102 samples and 723 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	35.3	80.2
25-49	23.5	7.3
50-99	32.4	10.0
100-199	2.9	1.0
200-499	4.9	1.4
500-999	1.0	0.1
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 259.--Occurrence of Pitar morrhuanus in bottom sediments, based on 89 samples and 255 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	2.2	0.8
Shell	--	--
Sand-shell	2.2	0.8
Sand	61.9	63.1
Silty-sand	24.8	24.7
Silt	2.2	1.2
Clay	6.7	9.4
Total	100.0	100.0

Table 260.--Bathymetric occurrence of Pitar sp., based on 60 samples and 130 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	25.0	23.1
25-49	70.0	72.3
50-99	3.3	3.8
100-199	1.7	0.8
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 261.--Occurrence of Pitar sp. in bottom sediments, based on 60 samples and 130 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.7	1.5
Sand-gravel	--	--
Till	--	--
Shell	3.3	1.5
Sand-shell	21.7	23.2
Sand	68.3	69.2
Silty sand	5.0	4.6
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 262.--Bathymetric occurrence of Petricola pholadiformis, based on 7 samples and 27 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	85.7	96.3
25-49	14.3	3.7
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 263.--Occurrence of Petricola pholadiformis in bottom sediments, based on three samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	33.3	16.7
Sand-shell	--	--
Sand	33.3	66.6
Silty sand	33.3	16.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 264.--Bathymetric occurrence of Mya arenaria, based on 62 samples and 281 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	43.5	49.8
25-49	16.1	10.0
50-99	32.3	33.8
100-199	8.1	6.4
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 265.--Occurrence of Mya arenaria in bottom sediments, based on 53 samples and 262 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.9	0.4
Sand-gravel	5.7	2.3
Till	5.7	1.5
Shell	1.9	0.4
Sand-shell	--	--
Sand	13.2	5.0
Silty sand	37.7	41.6
Silt	13.2	29.3
Clay	20.7	19.5
Total	100.0	100.0

Table 266.--Bathymetric occurrence of Corbulidae, based on 56 samples and 150 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	58.9	56.0
25-49	21.4	24.7
50-99	17.9	18.0
100-199	1.8	1.3
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 267.--Occurrence of Corbulidae in bottom sediments, based on 56 samples and 150 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.8	1.3
Sand-gravel	--	--
Till	--	--
Shell	5.3	4.0
Sand-shell	37.5	38.0
Sand	41.1	38.0
Silty sand	14.3	18.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 268.--Bathymetric occurrence of Corbula contracta, based on 22 samples and 46 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	13.6	8.7
25-49	27.3	28.3
50-99	45.5	41.3
100-199	13.6	21.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 269.--Occurrence of Corbula contracta in bottom sediments, based on 19 samples and 41 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	52.6	48.8
Silty sand	31.6	26.8
Silt	5.3	9.8
Clay	10.5	14.6
Total	100.0	100.0

Table 270.--Bathymetric occurrence of Corbula krebsiana, based on 41 samples and 97 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	9.8	6.2
25-49	63.4	55.7
50-99	21.9	35.0
100-199	4.9	3.1
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 271.--Occurrence of Corbula krebsiana in bottom sediments, based on 41 samples and 97 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	4.9	3.1
Sand-shell	29.3	36.1
Sand	63.4	58.7
Silty sand	2.4	2.1
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 272.--Bathymetric occurrence of Hiatellidae, based on 7 samples and 17 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	57.1	29.4
50-99	28.6	11.8
100-199	14.3	58.8
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 273.--Occurrence of Hiatellidae in bottom sediments, based on 7 samples and 17 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	14.3	58.8
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	71.4	35.3
Silty sand	--	--
Silt	--	--
Clay	14.3	5.9
Total	100.0	100.0

Table 274.--Bathymetric occurrence of Hiatella arctica, based on 149 samples and 3,474 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	2.0	2.3
25-49	22.8	68.8
50-99	51.0	24.1
100-199	21.5	4.7
200-499	2.7	0.1
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 275.--Occurrence of Hiatella arctica in bottom sediments, based on 117 samples and 3,353 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	29.0	61.4
Sand-gravel	23.9	20.0
Till	12.0	4.1
Shell	2.6	1.8
Sand-shell	6.0	2.1
Sand	12.0	9.7
Silty sand	7.7	0.6
Silt	1.7	0.1
Clay	5.1	0.2
Total	100.0	100.0

Table 276.--Bathymetric occurrence of Panomya arctica, based on 19 samples and 64 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	5.3	1.6
50-99	52.6	78.1
100-199	26.3	14.1
200-499	15.8	6.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 277.--Occurrence of Panomya arctica in bottom sediments, based on 12 samples and 48 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	16.8	6.2
Sand-gravel	--	--
Till	25.0	72.9
Shell	8.3	4.2
Sand-shell	--	--
Sand	8.3	2.1
Silty sand	33.3	10.4
Silt	--	--
Clay	8.3	4.2
Total	100.0	100.0

Table 278.--Bathymetric occurrence of Pandora gouldiana, based on 33 samples and 144 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	21.2	27.8
25-49	27.3	13.9
50-99	39.4	50.7
100-199	12.1	7.6
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 279.--Occurrence of Pandora gouldiana in bottom sediments, based on 27 samples and 105 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	3.7	7.5
Sand-gravel	3.7	1.0
Till	3.7	1.0
Shell	3.7	2.9
Sand-shell	--	--
Sand	63.0	81.8
Silty sand	3.7	1.0
Silt	7.4	1.9
Clay	11.1	2.9
Total	100.0	100.0

Table 280.--Bathymetric occurrence of Pandora inflata, based on 17 samples and 34 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	5.9	2.9
25-49	17.6	17.6
50-99	17.6	11.8
100-199	58.9	67.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 281. --Occurrence of Pandora inflata in bottom sediments, based on 17 samples and 34 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	5.9	2.9
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	41.2	47.1
Silty sand	52.9	50.0
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 282.--Bathymetric occurrence of Pandora inornata, based on 21 samples and 159 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	57.1	33.3
25-49	28.6	19.5
50-99	14.3	47.2
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 283.--Occurrence of Pandora inornata in bottom sediments, based on 11 samples and 110 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	9.1	6.4
Sand-gravel	9.1	0.9
Till	--	--
Shell	--	--
Sand-shell	9.1	0.9
Sand	54.5	88.2
Silty sand	18.2	3.6
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 284.--Bathymetric occurrence of Pandora trilineata, based on 9 samples and 11 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	66.7	72.7
25-49	33.3	27.3
50-99	--	--
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 285.--Occurrence of Pandora trilineata in bottom sediments, based on 9 samples and 11 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	22.2	18.2
Sand	77.8	81.8
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 286.--Bathymetric occurrence of Pandora sp., based on 8 samples and 11 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	25.0	27.3
25-49	25.0	18.2
50-99	37.5	36.3
100-199	--	--
200-499	12.5	18.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 287.--Occurrence of Pandora sp. in bottom sediments, based on six samples and eight specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	83.3	75.0
Silty sand	16.7	25.0
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 288.--Bathymetric occurrence of Lyonsia arenosa, based on 20 samples and 81 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	28.6	21.0
25-49	28.6	24.7
50-99	38.1	53.1
100-199	--	--
200-499	4.7	1.2
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 289.--Occurrence of Lyonsia arenosa in bottom sediments, based on 19 samples and 76 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	20.0	19.7
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	60.0	67.1
Silty sand	10.0	5.3
Silt	10.0	7.9
Clay	--	--
Total	100.0	100.0

Table 290.--Bathymetric occurrence of Lyonsia hyalina, based on 129 samples and 544 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	32.6	21.5
25-49	34.8	46.1
50-99	32.6	32.4
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 291.--Occurrence of Lyonsia hyalina in bottom sediments, based on 115 samples and 492 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	4.3	1.6
Till	--	--
Shell	--	--
Sand-shell	7.8	3.9
Sand	78.3	90.7
Silty sand	7.0	2.0
Silt	1.7	1.6
Clay	0.9	0.2
Total	100.0	100.0

Table 292.--Bathymetric occurrence of Lyonsia sp., based on five samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	40.0	33.3
25-49	20.0	16.7
50-99	40.0	50.0
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 293.--Occurrence of Lyonsia sp. in bottom sediments, based on five samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	20.0	16.7
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	60.0	66.6
Silty sand	20.0	16.7
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 294.--Bathymetric occurrence of Periploma fragile, based on 27 samples and 101 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	3.7	3.0
25-49	3.7	4.0
50-99	77.8	88.0
100-199	7.4	2.0
200-499	7.4	3.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 295.--Occurrence of Periploma fragile in bottom sediments, based on 27 samples and 101 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	3.7	3.0
Sand	37.1	21.8
Silty sand	33.3	20.8
Silt	11.1	20.8
Clay	14.8	33.6
Total	100.0	100.0

Table 296.--Bathymetric occurrence of Periploma leanum, based on 27 samples and 60 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	33.3	30.0
25-49	25.9	38.3
50-99	25.9	21.7
100-199	14.9	10.0
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 297.--Occurrence of Periploma leanum in bottom sediments, based on 22 samples and 49 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	22.7	18.4
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	45.5	61.2
Silty sand	18.2	10.2
Silt	--	--
Clay	13.6	10.2
Total	100.0	100.0

Table 298.--Bathymetric occurrence of Periploma papyratium, based on 265 samples and 2,976 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	1.1	1.3
25-49	7.9	9.7
50-99	49.4	68.5
100-199	24.5	13.5
200-499	17.1	7.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 299.--Occurrence of Periploma papyratium in bottom sediments, based on 264 samples and 2,975 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.1	0.4
Sand-gravel	1.5	9.2
Till	7.6	13.9
Shell	--	--
Sand-shell	0.4	0.1
Sand	22.7	7.5
Silty sand	28.4	26.2
Silt	9.5	11.7
Clay	28.8	31.0
Total	100.0	100.0

Table 300.--Bathymetric occurrence of Periploma sp., based on four samples and four specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	75.0	75.0
100-199	--	--
200-499	25.0	25.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 301.--Occurrence of Periploma sp. in bottom sediments, based on four samples and four specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	50.0	50.0
Silty sand	50.0	50.0
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 302.--Bathymetric occurrence of Thraciidae, based on 19 samples and 36 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	36.8	33.3
25-49	26.3	25.0
50-99	21.1	25.0
100-199	5.3	2.8
200-499	10.5	13.9
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 303.--Occurrence of Thraciidae in bottom sediments, based on 19 samples and 36 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	15.8	8.3
Sand	73.7	77.8
Silty sand	10.5	13.9
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 304.--Bathymetric occurrence of Thracia conradi, based on 6 samples and 10 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	50.0	70.0
25-49	16.7	10.0
50-99	33.3	20.0
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 305.--Occurrence of Thracia conradi in bottom sediments, based on 6 samples and 10 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	16.7	30.0
Shell	--	--
Sand-shell	--	--
Sand	16.7	10.0
Silty sand	33.3	20.0
Silt	33.3	40.0
Clay	--	--
Total	100.0	100.0

Table 306.--Bathymetric occurrence of Thracia septentrionalis, based on 13 samples and 46 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	7.7	4.4
25-49	30.8	21.7
50-99	61.5	73.9
100-199	--	--
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 307.--Occurrence of Thracia septentrionalis in bottom sediments, based on 12 samples and 45 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	8.3	6.7
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	91.7	93.3
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 308.--Bathymetric occurrence of Poromya sp., based on six samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	16.7	16.7
25-49	33.3	33.3
50-99	--	--
100-199	33.3	33.3
200-499	16.7	16.7
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 309.--Occurrence of Poromya sp. in bottom sediments, based on six samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	16.7	16.7
Sand	50.0	50.0
Silty sand	33.3	33.3
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 310.--Bathymetric occurrence of Cuspidariidae, based on 9 samples and 11 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	11.1	9.1
50-99	22.2	18.2
100-199	22.2	27.3
200-499	44.5	45.4
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 311.--Occurrence of Cuspidariidae in bottom sediments, based on 9 samples and 11 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	11.1	9.1
Sand	55.6	54.5
Silty sand	33.3	36.4
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 312.--Bathymetric occurrence of Cardiomya perrostrata, based on 13 samples and 24 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	76.9	87.5
200-499	15.4	8.3
500-999	7.7	4.2
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 313.--Occurrence of Cardiomya perrostrata in bottom sediments, based on 13 samples and 24 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	46.1	41.6
Silty sand	38.5	50.0
Silt	7.7	4.2
Clay	7.7	4.2
Total	100.0	100.0

Table 314.--Bathymetric occurrence of Cuspidaria glacialis, based on 49 samples and 184 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	18.4	22.8
100-199	55.1	60.4
200-499	18.4	12.5
500-999	6.1	3.8
1000-1999	--	--
2000-3999	2.0	0.5
Total	100.0	100.0

Table 315.--Occurrence of Cuspidaria glacialis in bottom sediments, based on 48 samples and 181 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	2.1	0.6
Sand-gravel	--	--
Till	20.8	38.1
Shell	--	--
Sand-shell	--	--
Sand	12.5	16.0
Silty sand	22.9	14.4
Silt	4.2	5.5
Clay	37.5	25.4
Total	100.0	100.0

Table 316.--Bathymetric occurrence of Cuspidaria obesa, based on 14 samples and 30 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	28.6	36.7
200-499	35.7	23.3
500-999	35.7	40.0
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 317.--Occurrence of Cuspidaria obesa in bottom sediments, based on 14 samples and 30 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	7.1	13.3
Sand-gravel	--	--
Till	14.3	13.3
Shell	--	--
Sand-shell	--	--
Sand	14.3	13.3
Silty sand	28.6	36.7
Silt	14.3	6.7
Clay	21.4	16.7
Total	100.0	100.0

Table 318.--Bathymetric occurrence of Cuspidaria parva, based on two samples and three specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	--	--
100-199	50.0	33.3
200-499	--	--
500-999	50.0	66.7
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 319.--Occurrence of Cuspidaria parva in bottom sediments, based on two samples and three specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	--	--
Silt	50.0	66.7
Clay	50.0	33.3
Total	100.0	100.0

Table 320.--Bathymetric occurrence of Cuspidaria pellucida, based on 4 samples and 19 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	25.0	26.3
100-199	75.0	73.7
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 321.--Occurrence of Cuspidaria pellucida in bottom sediments, based on 3 samples and 14 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	--	--
Silty sand	33.3	64.3
Silt	--	--
Clay	66.7	35.7
Total	100.0	100.0

Table 322.--Bathymetric occurrence of Cuspidaria sp., based on 69 samples and 112 specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	1.4	3.5
50-99	1.4	0.9
100-199	49.4	55.4
200-499	39.2	29.5
500-999	5.8	8.9
1000-1999	1.4	0.9
2000-3999	1.4	0.9
Total	100.0	100.0

Table 323.--Occurrence of Cuspidaria sp. in bottom sediments, based on 66 samples and 104 specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	1.5	1.0
Sand-gravel	3.0	4.8
Till	4.5	3.8
Shell	--	--
Sand-shell	--	--
Sand	10.6	10.6
Silty sand	30.4	29.8
Silt	9.1	4.8
Clay	40.9	45.2
Total	100.0	100.0

Table 324.--Bathymetric occurrence of Plectodon sp., based on four samples and six specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	--	--
50-99	25.0	16.7
100-199	75.0	83.3
200-499	--	--
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 325.--Occurrence of Plectodon sp. in bottom sediments, based on four samples and six specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	75.0	83.3
Sand	25.0	16.7
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

Table 326.--Bathymetric occurrence of Verticordia ornata, based on seven samples and eight specimens.

Depth range (m)	Percentage of	
	Samples	Specimens
0-24	--	--
25-49	57.1	62.5
50-99	--	--
100-199	14.3	12.5
200-499	28.6	25.0
500-999	--	--
1000-1999	--	--
2000-3999	--	--
Total	100.0	100.0

Table 327.--Occurrence of Verticordia ornata in bottom sediments, based on seven samples and eight specimens.

Bottom type	Percentage of	
	Samples	Specimens
Gravel	--	--
Sand-gravel	--	--
Till	--	--
Shell	--	--
Sand-shell	--	--
Sand	100.0	100.0
Silty sand	--	--
Silt	--	--
Clay	--	--
Total	100.0	100.0

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